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Environment Plan

Offshore Gas Victoria

Drilling Program

Review record (record the last 3 revisions here or the revisions required to achieve current approval version)

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THE THREE WHATS
What can go wrong?
What could cause it to go wrong?
What can I do to prevent it?

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Acronyms

Terms/acronym	Definition/Expansion
ABS	Australian Bureau of Statistics
AEP	Australian Energy Producers
AFMA	Australian Fisheries Management Authority
AHO	Australian Hydrographic Office
ALARP	As Low as Reasonably Practicable
AMOSC	Australian Marine Oil Spill Centre
AMP	Australian Marine Park
AMSA	Australian Maritime Safety Authority
ANZECC	Australian and New Zealand Environment and Conservation Council
ASAP	As Soon as Practicable
Bass Strait CZSF	Bass Strait Central Zone Scallop Fishery
bbl	Barrel
BCP	Business Continuity Plan
Beach	Beach Energy (Operations) Limited
BIA	Biologically Important Area
BLCAC	Bunurong Land Council Aboriginal Corporation
BOM	Bureau of Meteorology
BOP	Blow-out Preventer
BRS	Bureau of Resource Sciences
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
CCS	Capping and Containment Stack System
CH_4	Methane
CMP	Crisis Management Plan
CMT	Crisis Management Team
CO	Carbon monoxide
CO_2	Carbon dioxide
COLREG	Convention on The International Regulations for Preventing Collisions at Sea
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CxP	Crisis Communications Plan
CxT	Crisis Communications Team
DAFF	Department of Agriculture, Fisheries and Forestry formerly part of DAWE
DAWE	Commonwealth Department of Agriculture, Water and the Environment
dB	Decibel

Terms/acronym	Definition/Expansion
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water formerly DAWE
DEECA	Victorian Department of Energy, Environment and Climate Action (formerly Victorian Department of Jobs, Precincts and Regions)
DJPR	Victorian Department of Jobs, Precincts and Regions now DEECA
DNP	Commonwealth Director of National Parks
DNRET	Department of Natural Resources and Environment Tasmania
DO	Dissolved Oxygen
DoD	Department of Defence
DotEE	Commonwealth Department of the Environment and Energy now DCCEEW
DP	Dynamic Positioning
DPE	Department of Planning and Environment (New South Wales)
DPI	Department of Primary Industries
DPIPWE	Tasmanian Department of Primary Industries, Parks, Water and Environment now DNRET
DPIR	Department of Primary Industries and Regions
DSEWPaC	Commonwealth Department of Sustainability, Environment, Water, Population and Communities
DST	Drill Stem Test
EHS	Environment, Health, and Safety
EIS	Environmental Impact Statement
EMAC	Eastern Maar Aboriginal Corporation
EMBA	Environment That May Be Affected
EMP	Emergency Management Plan
EMPCA	*Environmental Management and Pollution Control Act 1994*
EMT	Emergency Management Team
ENSO	El Niño – Southern Oscillation
EP	Environment Plan
EPA	Environmental Protection Authority
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EPO	Environment Performance Outcome
EPS	Environment Performance Standard
ERP	Emergency Response Plan
ERT	Emergency Response Team
ESD	Ecologically Sustainable Development
ETBF	Eastern Tuna and Billfish Fishery
FFG	Flora and Fauna Guarantee Act
FRDC	Fisheries Research and Development Corporation

Terms/acronym	Definition/Expansion
GHG	Greenhouse gas
HF	High Frequency
HSE	Health, Safety and Environment
HSEMS	Health, Safety and Environment Management System
Hz	Hertz
IAOGP	International Association of Oil & Gas Producers
IAPP	International Air Pollution Prevention
IFC	International Finance Corporation
ILUA	Indigenous Land Use Agreement
IMAS	Institute for Marine and Antarctic Studies
IMO	International Maritime Organisation
IMOS	Integrated Marine Observing System
IMS	Invasive Marine Species
IOGP	International Association of Oil and Gas Producers
IPA	Indigenous Protection Area
IUCN	International Union for Conservation of Nature
JRCC	Joint Rescue Coordination Centre
KEF	Key Ecological Feature
kt CO2-e	Kilo tonnes of CO_2 equivalent
LALC	Local Aboriginal Land Council
Lattice	Lattice Energy Limited
LC50	Lethal Concentration 50
LF	Low Frequency
LGA	Local Government Area
LOC	Loss of Containment
LOR	Limit of Reporting
LOWC	Loss of Well Containment
MARPOL	International Convention for The Prevention of Pollution from Ships
MC	Measurement Criteria
MDO	Marine Diesel Oil
MEG	Monoethylene Glycol
MMO	Marine Mammal Observer
MMSCF	Million Standard Cubic Feet
MNES	Matters of National Environmental Significance
MO	Marine Order
MoC	Management of Change
MODU	Mobile Offshore Drilling Unit

Terms/acronym	Definition/Expansion
MoU	Memorandum of Understanding
MT	Metric Tonne
N_2O	Nitrous oxide
NatPlan	National Plan for Maritime Environmental Emergencies
NCVA	National Conservation Values Atlas
NEBA	Net Environmental Benefit Analysis
NERA	National Energy Resources Australia
NGER	National Greenhouse and Energy Reporting
NO_2	Nitrogen dioxide
NORM	Naturally Occurring Radioactive Material
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
NOx	Nitrous oxides
NPI	National Pollution Inventory
NPWS	National Parks and Wildlife Service (NSW)
NRDA	Natural Resource Damage Assessment
NSW	New South Wales
NWS	North West Shelf
O_3	Ozone
OCNS	Offshore Chemical Notification Scheme
ODS	Ozone-depleting substances
OEMS	Operations Excellence Management System
OGUK	Oil and Gas UK (now Offshore Energies UK)
OEUK	Offshore Energies UK
OGV	Offshore Gas Victoria
OPEP	Oil Pollution Emergency Plan
OPGGS Act	Offshore Petroleum and Greenhouse Gas Storage Act 2006
OPGGS(E)R	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023
OPP	Offshore Project Proposal
ORCV	Ocean Racing Club of Victoria
Origin	Origin Energy Resources Limited
ORP	Oxidation-Reduction Potential
OSMP	Operational and Scientific Monitoring Plan
OSPAR	Oslo and Paris Conventions
OSTM	Oil Spill Trajectory Modelling
OSV	Offshore Support Vessel
OWR	Oiled Wildlife Response
P&A	Plug and Abandon

Terms/acronym	Definition/Expansion
PAH	Poly aromatic hydrocarbons
Pb	Lead
PFC	Perfluorocarbons
PMST	Protected Matters Search Tool
POB	Persons on Board
POLREP	Marine Pollution Report
ppb	Parts Per Billion
ppm	Parts Per Million
PSZ	Petroleum Safety Zone
PTS	Permanent Threshold Shift
RAP	Registered Aboriginal Party
ROV	Remotely Operated Vehicle
SBDF	Synthetic Base Drilling Fluid
SBTF	Southern Bluefin Tuna Fishery
SCCP	Source Control Contingency Plan
SEEMP	Ship Energy Efficiency Management Plan
SEL	Sound Exposure Level
SESSF	Southern and Eastern Scalefish And Shark Fishery
SETFIA	South East Trawl Fishing Industry Association
SF_6	Sulphur hexafluoride
SIV	Seafood Industry Victoria
SMPEP	Shipboard Marine Pollution Emergency Plan
SMS	Short Message Service
SO_2	Sulphur dioxide
SOx	Sulphur oxides
SPE	Society of Petroleum Engineers
SPF	Small Pelagic Fishery
SPL	Sound Pressure Level
SPRAT	Species Profile and Threats
SRL	Southern Rock Lobster
SST	Sea surface temperature
tcf	Trillion cubic feet
TEC	Threatened Ecological Community
TKN	Total kjeldahl nitrogen
TN	Total nitrogen
TP	Total phosphorus
TRH	Total Recoverable Hydrocarbon

Terms/acronym	Definition/Expansion
TSC	Threatened Species Conservation
TSS	Total Suspended Solids
TSSC	Threatened Species Scientific Committee
TTS	Temporary Threshold Shift
VHF	Very High Frequency
VLSFO	Very Low Sulphur Fuel Oil
VSP	Vertical Seismic Profiling
WBDF	Water-Based Drilling Fluid
WECS	Well Engineering and Construction Management System
WET	Wells Emergency Team
WGCMA	West Gippsland Catchment Management Authority
WOMP	Well Operations Management Plan
Woodside	Woodside Petroleum Ltd
WTOAC	Wadawurrung Traditional Owners Aboriginal Corporation

1 Overview of the Activity

Beach Energy (Operations) Limited (Beach), proposes to undertake a Drilling Program within Commonwealth waters of the Otway and Bass Basins.

The proposed scope of the Drilling Program covered by this EP consists of:

- Drilling of up to six wells in Otway which may include a combination of:
  - Drilling of up to five exploration or appraisal wells in exploration licences VIC/P73 and/or VIC/P43.
  - Drilling of up to two exploration wells in exploration licence T/30P.
- Drilling of up to five wells in Bass which may include a combination of:
  - Drilling of up to four appraisal wells in retention licences T/L5, T/RL4 and/or T/RL5.
  - Drilling, testing (contingent), and completing one infield well (Yolla 7) in production licence T/L1.
- Plugging, abandonment and removal of well infrastructure above the mudline for five legacy suspended subsea exploration wells:
  - Thylacine 1 in T/L2
  - Geographe 1 in VIC/L23
  - Trefoil 1 in T/L5
  - Yolla 1 in T/L1
  - White Ibis 1 in T/RL4

The Operational Areas are where planned activities will occur. Within the Operational Area drilling and plug and abandonment (P&A) activities will be undertaken within a 3 km radius around the well sites whilst the drill rig is moored on location. The 3 km radius encompasses both the outer extent of mooring equipment on the seabed, and the 500 m petroleum safety zone (PSZ).

The estimated timings for each activity are:

- Drilling: 30 – 40 days per well.
- Completion: 15 – 20 days for one well, Yolla 7.
- Plug and abandonment: 15 – 20 days per well.

Activities will be conducted on a 24 hours per day, 7 days per week basis. The above timings equate to approximately 560 days of activity for the full Drilling Program and will be undertaken within the period of 1 November 2024 to the 31 December 2028.

OGV Drilling Program

Proposed activities will be undertaken with a single moored semi-submersible drill rig with a thruster assisted mooring system. The drill rig will be supported with up to three vessels.

Activities included in the scope of this EP are detailed in Section 3.

Activities excluded from the scope of this EP are:

- Vessels transiting to or from Operational Areas. The vessels are deemed to be operating under the Commonwealth *Navigation Act* 2012 and not performing a petroleum activity whilst outside the Operational Areas.
- Mobilisation of the drill rig and vessels into Australian Commonwealth waters and Victorian State waters, and associated biosecurity and ballast water management prior to the arrival of the drill rig and vessels into the Operational Areas. The drill rig and vessels are subject to biosecurity control on entering Australian territory (12 nm offshore) in accordance with the *Biosecurity Act* 2015. Biosecurity and ballast water management of the drill rig and vessels prior to their movement into the Operational Areas is managed directly by and remains the responsibility of the drill rig and vessel contractor.

1.1 Environment Plan Summary

This Offshore Gas Victoria – Drilling Program EP Summary has been prepared from material provided in this EP. The summary consists of the following (Table 1-1) as required by the Commonwealth Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023 (OPGGS(E)R).

Table 1-1: EP Summary of Material Requirements

EP Summary Material Requirement	Relevant Section of EP Containing EP Summary Material
The location of the activity	Section 3.1
A description of the receiving environment	Section 6
A description of the activity	Section 3
Details of the environmental impacts and risks	Section 7
A summary of the control measures for the activity	Section 7.15
A summary of the arrangements for ongoing monitoring of the titleholder's environmental performance	Section 8.3
A summary of the response arrangements in the oil pollution emergency plan	See OPEP
Details of consultation already undertaken and plans for ongoing consultation	Section 4
Details of the titleholders nominated liaison person for the activity	Section 1.2

1.2 Titleholder and Liaison Person Details

Beach Energy (Operations) Limited, a company wholly owned by Beach Energy Limited (Beach), is the operator of the petroleum assets located in the Otway and Bass basins. Table 1-2 details the titleholders and the liaison person for the title applicable to the activity.

Beach is an Australian Stock Exchange listed oil and gas exploration and production company headquartered in Adelaide, South Australia. Beach has operated and non-operated, onshore, and offshore oil and gas production assets in five producing basins across Australia and New Zealand and is a key supplier to the Australian east coast gas market.

Beach's asset portfolio includes ownership interests in strategic oil and gas infrastructure, as well as a suite of high potential exploration prospects. Beach's gas exploration and production portfolio includes acreage in the Otway, Bass, Cooper/Eromanga, Perth, Browse and Bonaparte basins in Australia, as well as the Taranaki basin in New Zealand (Figure 1-1).

Beach will notify National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) of any change in titleholder, a change in the titleholder's nominated liaison for the activity, or a change in the contact details for either the titleholder or the nominated liaison as soon as practicable after such a change takes place.

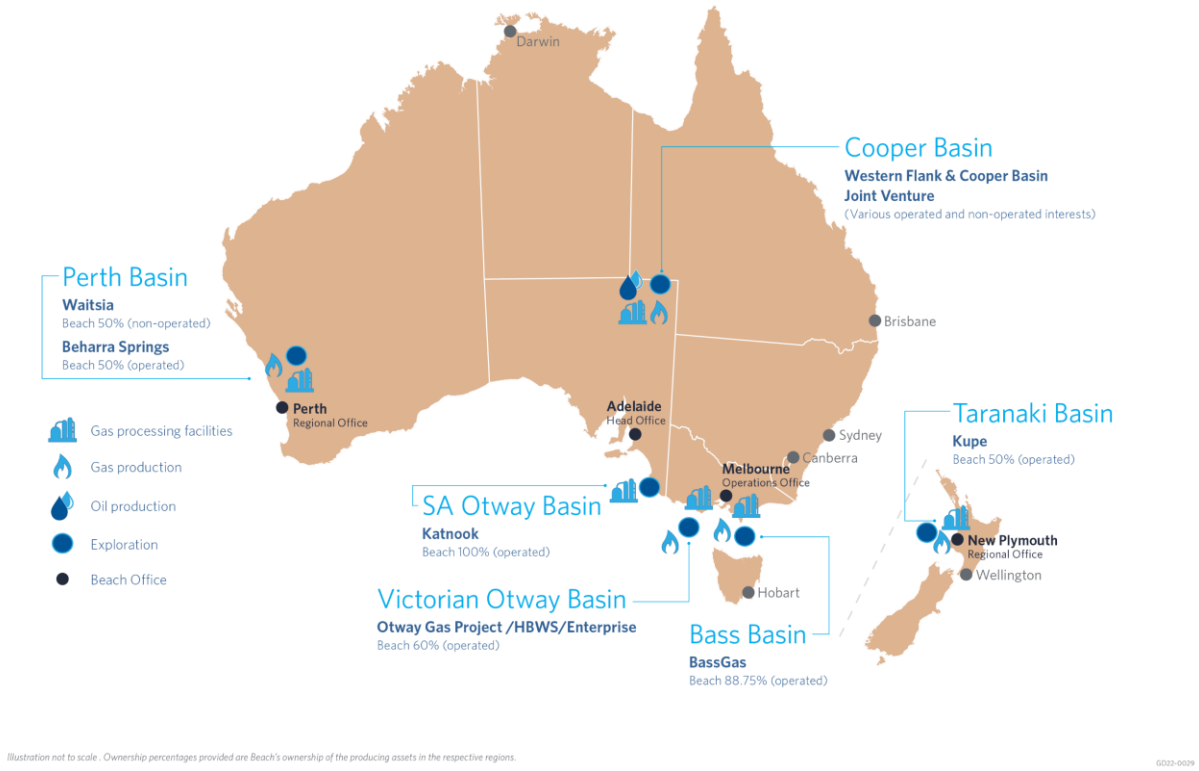


Figure 1-1: Beach Operations

Table 1-2: Details of Titleholder and Liaison Person

Petroleum Title(s)	Titleholders	
Otway		
VIC/P43	Beach Energy (Operations) Limited – Operator OGOG (Otway) Pty Ltd	
VIC/P73		
VIC/L23	Beach Energy (Operations) Limited – Operator OGOG (Otway) Pty Ltd Beach Energy (Otway) Limited	
T/L2		
T/30P	Beach Energy (Operations) Limited – Operator and sole titleholder	
Bass		
T/L1	Beach Energy (Operations) Limited – Operator Beach Energy Limited Prize Petroleum International Pte. Ltd. Beach Energy (Bass Gas) Limited	
T/L5	Beach Energy (Operations) Limited – Operator Beach Energy Limited Prize Petroleum International Pte. Ltd.	
T/RL4		
T/RL5		
Titleholder Details		
Beach Energy (Operations) Limited – Operator	Business address	Level 8 80 Flinders Street Adelaide South Australia 5000
	Telephone number	(08) 8338 2833
	Email address	info@beachenergy.com.au
	Australian Company Number	007 845 338
Titleholder Liaison Person		
Carrie Trembath Project Director VIC Offshore Development	Business address	Level 8 80 Flinders Street Adelaide South Australia 5000
	Telephone number	(08) 8338 2833
	Email address	info@beachenergy.com.au

2 Environmental Impact and Risk Assessment Methodology

2.1 Overview

This section outlines the environmental impact and risk assessment methodology used for the assessment of the program activities. The methodology is consistent with the Australian and New Zealand Standard for Risk Management (AS/NZS ISO 31000:2018, *Risk Management – Principles and Guidelines*). Figure 2-1 outlines this risk assessment process.

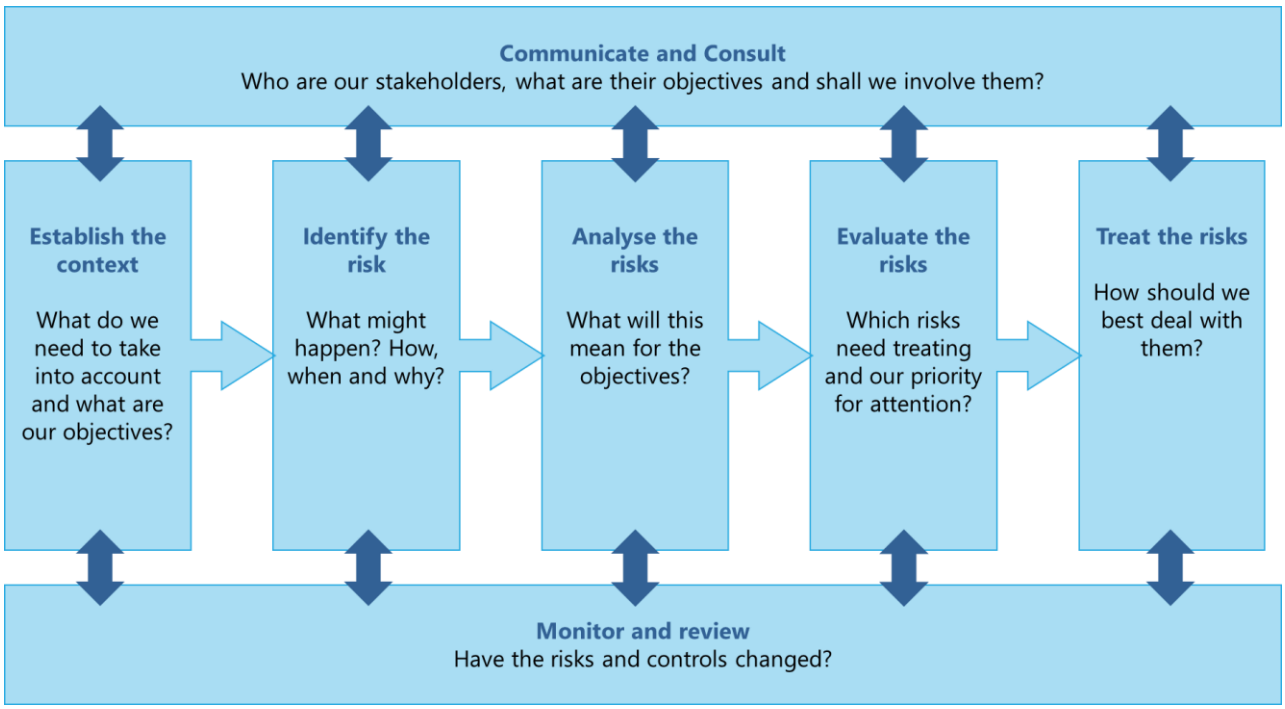


Figure 2-1: Risk Assessment Process

2.1.1 Definitions

Definitions of the term used in the risk assessment process are detailed in Table 2-1.

Table 2-1: Risk Assessment Process Definitions

Term	Definition
Activity	Refers to a 'petroleum activity' as defined under the OPGGS(E)R as: *petroleum activity means operations or works in an offshore area undertaken for the purpose of:* *exercising a right conferred on a petroleum titleholder under the Act* by a petroleum title; or* *discharging an obligation imposed on a petroleum titleholder by the Act or a legislative instrument under the Act*.* *Act is this context is the OPGGS Act.
Consequence	The consequence of an environmental impact is the potential outcome of the event on affected receptors (particular values and sensitivities). Consequence can be positive or negative.
Control measure	Defined under the OPGGS(E)R as *a system, an item of equipment, a person or a procedure, that is used as a basis for managing environmental impacts and risks.*
Emergency condition	An unplanned event that has the potential to cause significant environmental damage or harm to a Matter of National Environmental Significance (MNES). An environmental emergency condition may, or may not, correspond with a safety incident considered to be a Major Accident Event.
Environment	Under the OPGGS(E)R as *means:* *(a) ecosystems and their constituent parts, including people and communities; and* *(b) natural and physical resources; and* *(c) the qualities and characteristics of locations, places and areas; and* *(d) the heritage value of place;* *and includes* *(e) the social, economic and cultural features of the matters mentioned in paragraphs (a), (b), (c) and (d).*
Environmental aspect	An element or characteristic of an operation, product, or service that interacts or can interact with the environment. Environmental aspects can cause environmental impacts.
Environmental impact	Defined under the OPGGS(E)R as *any change to the environment, whether adverse or beneficial, that wholly or partially results from an activity.*
Environmental performance outcome	Defined under the OPGGS(E)R as *a measurable level of performance required for the management of environmental aspects of an activity to ensure that environmental impacts and risks will be of an acceptable level.*
Environmental performance standard	Defined under the OPGGS(E)R as *a statement of the performance required of a control measure.*
Environment receptors (or receptors)	Features of the environment that may be affected by impacts and risks.
Environmental risk	An unplanned environmental impact has the potential to occur, due either directly or indirectly from undertaking the activity.
Likelihood	The is the chance of the impact occurring.
Measurement criteria	Is a verifiable mechanism for determining control measures are performing as required.
Receptor	A receptors is a component of the environment that may be affected by the activity.

Term	Definition
Residual risk	The risk remaining after control measures have been applied (i.e. after risk treatment).

2.2 Communicate and Consult

In alignment with the OPGGS(E)R, during the development of this EP, Beach has consulted with relevant persons to obtain information in relation to their functions, interests and activities associated with the activity and potential impacts and risks. This information has been used to inform the EP and the impact and risk assessment undertaken for the activity.

2.3 Establish the Context

Context for the risk assessment process is established by:

- Identifying the environmental aspects of the activity that will or may cause environmental impacts or may present risks to the environment based on the 'Activity Description' in Section 3.
- Understanding the objections or claims of relevant persons and incorporating their feedback and any information provided into the design of the activity where appropriate as outlined in Section 4, 'Stakeholder Consultation'.
- Understanding the regulatory framework in which the activity takes place as described in Section 4.5, 'Applicable Requirements'.
- Identifying the environment that may be affected, either directly or indirectly, by the activity, as described in the 'Existing Environment' in Section 6).

2.4 Identify the Potential Impacts and Risks

Potential impacts (planned) and risks (unplanned) associated with the environmental aspects of the activity are identified in relation to the receptors that may be affected, either directly or indirectly, by one or multiple aspects of the activity i.e., identifying the cause-effect pathway by which environmental and social receptors may be impacted. Table 7-1 details the aspects identified for the activity.

2.5 Analyse the Potential Impacts and Risks

Once impacts and risks have been identified, an analysis of the nature and scale of the impact or risk is undertaken. This involves determining the possible contributing factors associated with the impact or risk. Each possible cause should be identified separately, particularly where controls to manage the risk differ. In this way, the controls can be directly linked to the impact or risk.

2.5.1 Establish Environmental Performance Outcomes

Environmental performance outcomes (EPOs) are developed to provide a measurable level of performance for the management of environmental aspects of an activity to ensure that environmental impacts and risks will be of an acceptable level. The process of defining an appropriate EPO, has relied on the required levels of performance set either in legislation (such as the OPGGS Act), Government guidance notes such as the Matters of National Environmental Significance–Significant Impact Guidelines (CoA 2013), EPBC Act recovery/management plans or may be the result of consultation with relevant persons and/ or organisations (e.g. fishers, marine users, First Nations).

2.6 Evaluate and Treat the Potential Impacts and Risks

The following steps are undertaken using the Beach Risk Matrix (Table 2-2) to evaluate the potential impacts and risks:

- Identify the consequences of each potential environmental impact, corresponding to the maximum credible impact.
- For unplanned events, identify the likelihood (probability) of unplanned environmental impacts occurring.
- For unplanned events, assign a level of risk to each potential environmental impact using the risk matrix.
- Identify control measures to manage potential impacts and risks to as low as reasonably practicable (ALARP) (Section 2.7) and an acceptable level (Section 2.8).
- Establish environmental performance standards for each of the identified control measures.

Table 2-2: Beach Risk Matrix

CDN 14740489 Beach Risk Matrix & Risk Management Quick Reference Guide

beach

Risk Matrix

CONSEQUENCE CATEGORY

CONSEQUENCE	PEOPLE	ENVIRONMENT	REPUTATION	FINANCIAL	LEGAL
	Impact to Beach or contracting personnel	Natural environment	Community safety, reputation/social licence. media, items of cultural significance.	Financial impact (e.g. due to loss of revenue, business interruption, asset loss etc.)	E.G. Breach of law, prosecution, civil action
6 Catastrophic	Multiple fatalities >4 or severe irreversible disability to large group of people (>10)	Catastrophic offsite or onsite release or spill; long-term destruction of highly significant ecosystems; significant effects on endangered species or habitats; irreversible or very long-term impact	Multiple community fatalities; complete loss of social licence; prolonged negative national media; complete loss of items of cultural significance	> AUD$500m	Prolonged and complex civil and/or regulatory litigation; potential jail terms and/or very high fines and/or damages claim
5 Critical	1-3 fatalities or serious irreversible disability (>30%) to multiple persons (<10)	Significant offsite or onsite release or spill; eradication or impairment of the ecosystem; significant impact on highly valued species or habitats; widespread long-term impact	Community fatality; significant loss of social licence; negative national media for 2 or more days; significant damage to items of cultural significance	>AUD$100m & ≤ $500m	Civil and/or regulatory litigation; potential significant fines and/or damages claim
4 Major	Serious permanent injury/ illness or moderate irreversible disability (<30%) to one or more persons	Major Offsite or onsite release or spill; very serious environmental effects, such as displacement of species and partial impairment of ecosystem; major impact on highly valued species or habitats; widespread medium and some long-term impact	Serious permanent injury to community member; major damage to social licence; negative national media; major damage to items of cultural significance	>AUD$10m & ≤ $100m	Civil and/or regulatory litigation; potential major fine and damages claim
3 Serious	Serious reversible/ temporary injury/illness; Lost Time Injury >5 days or Alternate/Restricted Duties > 1 month	Minor offsite or onsite release or spill; serious short-term effect to ecosystem functions; serious impact on valued species or habitats; moderate effects on biological or physical environment	Serious reversible injury to community member; serious damage to social licence; negative state media; serious damage to items of cultural significance	>AUD$1m & ≤$10m	Serious potential breach of law; report and investigation by regulator; possible prosecution or regulatory notice (e.g. improvement notice or equivalent), or possible civil litigation and serious damages claim
2 Moderate	Reversible temporary injury/ illness requiring Medical Treatment; Lost Time Injury ≤5 days or Alternate/Restricted Duties for ≤ 1 month	Event contained within site; short-term effects but not affecting ecosystem functions; some impact on valued species or habitats; minor short-term damage to biological and/or physical environment	Moderate injury to community member; moderate impact to social licence; negative local media; moderate damage to items of cultural significance	>AUD$100,000 & ≤ $1m	Potential Breach of law or non-compliance; inquiry by a regulator leading to Low-level legal issues; possible civil litigation and moderate damages claim
1 Minor	First Aid Injury/illness	Spill limited to release location; minor effects but not affecting ecosystem functions; no impact on valued species or habitats; low-level impacts on biological and physical environment	Minor injury to community member, public concern restricted to local complaints, minor damage to items of cultural significance	≤AUD$100,000	Minor potential breach of law; not reportable to a regulator; on the spot fine or technical non-compliance

LIKELIHOOD

CONSEQUENCE	A. Remote	B. Highly Unlikely	C. Unlikely	D. Possible	E. Likely	F. Almost Certain
	<1% chance of occurring within the next year. Requires exceptional circumstances, unlikely event in the long-term future. Only occurs as a 100-year event	> 1% chance of occurring within the next year. May occur but not anticipated. Could occur years to decades	> 5% chance of occurring within the next year. May occur but not for a while. Could occur within a few years	> 10% chance of occurring within the next year. May occur shortly but a distinct probability it won't. Could occur within months to years	> 50% chance of occurring within the next year. Balance of probability will occur. Could occur within weeks to months	99% chance of occurring within the next year. Impact is occurring now. Could occur within days to weeks
6 Catastrophic	HIGH	HIGH	SEVERE	SEVERE	EXTREME	EXTREME
5 Critical	MEDIUM	MEDIUM	HIGH	SEVERE	SEVERE	EXTREME
4 Major	MEDIUM	MEDIUM	MEDIUM	HIGH	SEVERE	SEVERE
3 Serious	LOW	MEDIUM	MEDIUM	MEDIUM	HIGH	SEVERE
2 Moderate	LOW	LOW	MEDIUM	MEDIUM	MEDIUM	HIGH
1 Minor	LOW	LOW	LOW	MEDIUM	MEDIUM	MEDIUM

2.7 Demonstration of ALARP

Beach's approach to demonstration of ALARP includes:

- Systematically identify and assess all potential environmental impacts and risks associated with the activity.
- Where relevant, apply industry 'good practice' controls to manage impacts and risks.
- Assess the effectiveness of the controls in place and determine whether the controls are adequate according to the 'hierarchy of control' principle.
- For higher order impacts and risks undertake a layer of protection analysis and implement further controls if both feasible and reasonably practicable to do so.

NOPSEMA's EP decision making guideline (NOPSEMA 2022) states that in order to demonstrate ALARP, a titleholder must be able to implement all available control measures where the cost is not grossly disproportionate to the environmental benefit gained from implementing the control measure.

For this EP, the guidance provided in NOPSEMA's EP decision making guideline (NOPSEMA 2022) has been applied, whereby the level of ALARP assessment is dependent upon the:

- Residual impact and risk level (high versus low).
- The degree of uncertainty associated with the assessed impact or risk.

2.7.1 Residual Impact and Risk Levels

2.7.1.1 Lower-order Environmental Impacts and Risks

NOPSEMA defines lower-order environmental impacts and risks as those where the environment or receptor is not formally managed, less vulnerable, widely distributed, not protected and/or threatened and there is confidence in the effectiveness of adopted control measures.

Impacts and risks are considered to be lower-order and ALARP when, using the Beach Environmental Risk Assessment Matrix (Table 2-2), the impact consequence is rated as 'minor' or 'moderate' or risks are rated as 'low', 'medium' or 'high.' In these cases, applying 'good industry practice' (as defined in Section 2.7.2.1) is sufficient to manage the impact or risk to ALARP.

2.7.1.2 Higher-order Environmental Impacts and Risks

All other impacts and risks are defined by NOPSEMA as higher-order environmental impacts and risks (i.e., where the environment or receptor is formally managed, vulnerable, restricted in distribution, protected, or threatened and there is little confidence in the effectiveness of adopted control measures).

Impacts and risks are considered to be higher-order when, using the Beach Environmental Risk Assessment Matrix (Table 2-2), the impact consequence is rated as 'serious', 'major', 'critical' or 'catastrophic', or when the risk is rated as 'severe' or 'extreme'. In these cases, further controls must be considered as per Section 2.7.2.

An iterative risk evaluation process is employed until such time as any further reduction in the residual risk ranking is not reasonably practicable to implement. At this point, the impact or risk is reduced to

ALARP. The determination of ALARP for the consequence of planned operations and the risks of unplanned events is outlined in Table 2-3.

Table 2-3: ALARP Determination for Consequence (Planned Operations) and Risk (Unplanned Events)

Consequence ranking	Minor	Moderate	Serious	Major	Critical	Catastrophic
Planned operation	Broadly acceptable	Tolerable if ALARP		Intolerable		
Residual impact category	Lower order impacts		Higher order impacts			
Risk ranking	Low	Medium	High	Severe	Extreme	
Unplanned event	Broadly acceptable	Tolerable if ALARP		Intolerable		
Residual risk category	Lower order risks			Higher order risks		

2.7.2 Uncertainty of Impacts and Risks

In addition to the evaluation of residual impacts and risks as described above, the relative level of uncertainty associated with the impact or risk is also used to inform whether the application of industry good practice is sufficient to manage impacts and risks to ALARP, or if the evaluation of further controls is required.

In alignment with NOPSEMA's ALARP Guidance Note (NOPSEMA 2022a), Beach have adapted the approach developed by Oil and Gas UK (OGUK) (OGUK 2014) for use in an environmental context to determine the assessment technique required to demonstrate that potential impacts and risks are ALARP (Figure 2-2). Specifically, the framework considers impact severity and several guiding factors:

- Activity type
- Risk and uncertainty
- Stakeholder influence

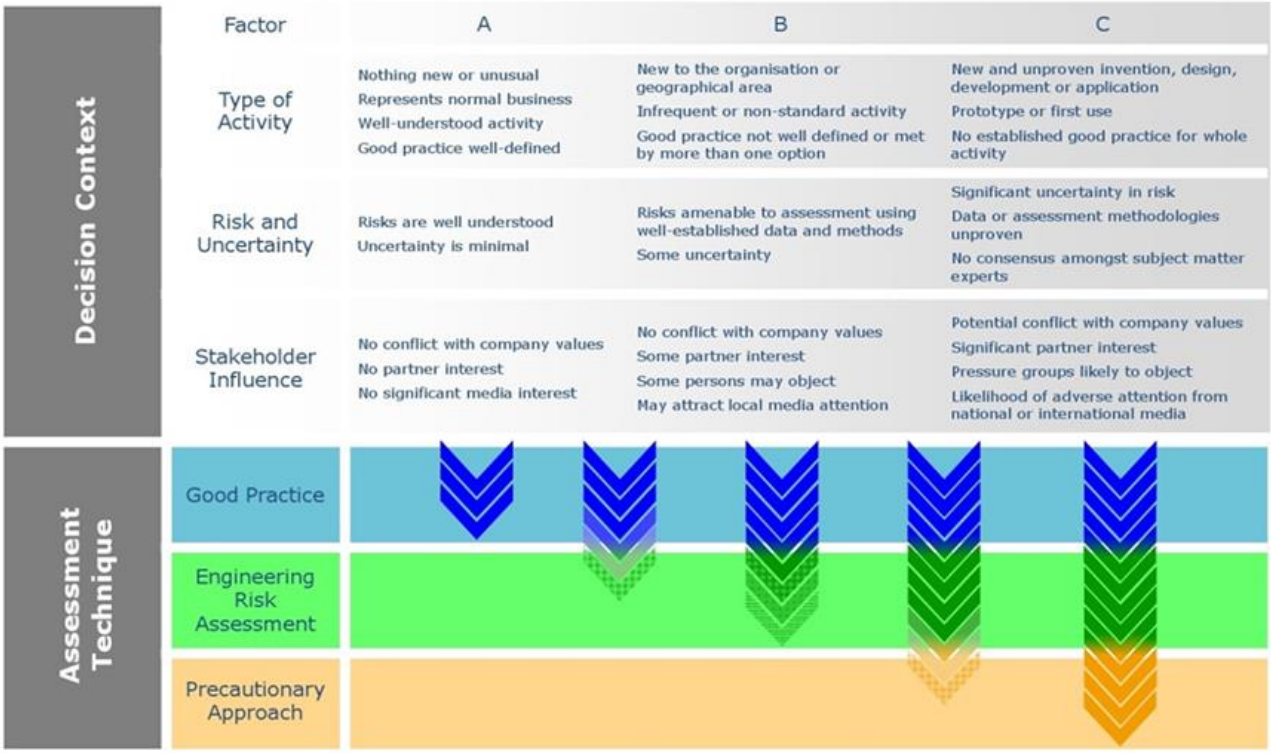


Figure 2-2: OGUK (2014) Decision Support Framework

A **Type A** decision is made if the risk is relatively well understood, the potential impacts are low, activities are well practised, and there are no conflicts with company values, no partner interests, and no significant media interests. However, if good practice is not sufficiently well-defined, additional assessment may be required.

A **Type B** decision is made if there is greater uncertainty or complexity around the activity and/or risk, the potential impact is moderate, and there are no conflict with company values, although there may be some partner interest, some persons may object, and it may attract local media attention. In this instance, established good practice is not considered sufficient and further assessment is required to support the decision and ensure the risk is ALARP.

A **Type C** decision typically involves sufficient complexity, high potential impact, uncertainty, or stakeholder influence to require a precautionary approach. In this case, relevant good practice still must be met, additional assessment is required, and the precautionary approach applied for those controls that only have a marginal cost benefit.

In accordance with the regulatory requirement to demonstrate that environmental impacts and risks are ALARP, Beach has considered the above decision context in determining the level of assessment required.

The levels of assessment techniques considered include:

- Good practice
- Engineering risk assessment
- Precautionary approach

2.7.2.1 Good Practice

OGUK (2014) defines 'good practice' as the recognised risk management practices and measures that are used by competent organisations to manage well-understood impacts and risks arising from their activities.

'Good practice' can also be used as the generic term for those measures that are recognised as satisfying the law. For this EP, sources of good practice include:

- Requirements from Australian legislation and regulations.
- Relevant Australian policies.
- Relevant Australian Government guidance.
- Relevant industry standards and/or guidance material.
- Relevant international conventions.

If the ALARP technique is determined to be 'good practice', further assessment ('engineering risk assessment') is not required to identify additional controls. However, additional controls that provide a suitable environmental benefit for an insignificant cost are also identified at this point.

2.7.2.2 Engineering Risk Assessment

All potential impacts and risks that require further assessment are subject to an 'engineering risk assessment'. Based on the various approaches recommended in OGUK (2014), Beach believes the methodology most suited to this activity is a comparative assessment of risks, costs, and environmental benefit. A cost–benefit analysis should show the balance between the risk benefit (or environmental benefit) and the cost of implementing the identified measure, with differentiation required such that the benefit of the control can be seen and the reason for the benefit understood.

2.7.2.3 Precautionary Approach

OGUK (2014) states that if the assessment, considering all available engineering and scientific evidence, is insufficient, inconclusive, or uncertain, then a precautionary approach to impact and risk management is needed. A precautionary approach will mean that uncertain analysis is replaced by conservative assumptions that will result in control measures being more likely to be implemented.

That is, environmental considerations are expected to take precedence over economic considerations, meaning that a control measure that may reduce environmental impact is more likely to be implemented. In this decision context, the decision could have significant economic consequences to an organisation.

2.8 Demonstration of Acceptability

The OPGGS(E)R requires demonstration that environmental impacts and risks are of an acceptable level.

Beach considers a range of factors to demonstrate the acceptability of the environmental impacts and risks, including:

- The principles of ecologically sustainable development (ESD).

- Other requirements (e.g. laws, policies, standards, conventions etc.), including significant impacts to MNES.
- Internal context.
- External context.

2.8.1 Principles of Ecologically Sustainable Development

Based on Australia's National Strategy for Ecologically Sustainable Development (ESD) (Council of Australian Governments 1992), Section 3A of the EPBC Act defines ecologically sustainable development as:

Using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained and the total quality of life, now and in the future, can be increased.

The principles of ESD as defined under the EPBC Act are provided in Table 2-4 and describes how the impact and risk methodology aligns with these principles.

Table 2-4: Relevant ESD Principles

Principle of ESD	Beach Implementation
Decision making processes should effectively integrate both long term and short term economic, environmental, social, and equitable considerations.	This principle is inherently met through the EP development process, as such this principal is not considered separately for each acceptability evaluation.
If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.	If there is, the project shall assess whether there is significant uncertainty in the evaluation, and if so, whether the precautionary approach should be applied.
The principle of inter-generational equity — that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.	The EP risk assessment methodology ensures that potential impacts and risks are ALARP, where the potential impacts and risks are determined to be serious or irreversible the precautionary principle is implemented to ensure the environment is maintained for the benefit of future generations. Consequently, this principal is not considered separately for each acceptability evaluation.
The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making.	Beach considers if there is the potential to affect biological diversity and ecological integrity through the impact and risk assessment process.

2.8.1.1 Internal Context

Beach's OEMS includes Elements and Standards relevant to the way Beach operates.

At the core of the OEMS are 11 Elements (see Section 8.1) which detail specific performance requirements for the implementation of Beach's Environmental Policy and management of potential HSE impacts and risks.

Elements and Standards in the OEMS which are relevant to either the activity, impact, control or receptor will be described within the internal context and contribute towards the assessment of acceptability.

To meet this acceptance criteria, the impact or risk must be compliant with the objectives of Beach's Environment Policy. Where specific internal procedures, guidelines, expectations are in place for management of the impact or risk in question, acceptability is demonstrated.

2.8.1.2 External Context

External context considers stakeholder expectations, obtained from stakeholder consultation.

Beach has undertaken stakeholder consultation, which is described in detail in Section 4. Where objections or claims have been raised, these are considered in the assessment of acceptability of related impacts and risks.

To meet this acceptance criteria, the merits of claims or objections raised by a relevant stakeholder must have been adequately assessed and additional controls adopted where appropriate.

2.8.1.3 Other Requirements

Aside from internal and external context, other requirements must be considered in the assessment of acceptability. These include:

- Environmental legislation (described in Section 2)
- Policies and guidelines (described in Section 2)
- International agreements (described in Section 2)
- EPBC Management Plans (described in Section 5.1)
- Australian Marine Park designations (described in Section 6.2.2)

This acceptance criteria is met when: compliance with specific laws or standards is demonstrated; management of the impact or risk is consistent with relevant industry practices; and the proposed impact or risk controls, environmental performance objectives and standards are consistent with the nature of the receiving environment based upon formal management plans.

2.9 Monitoring and Review

Monitoring and review activities are incorporated into the impact and risk management process to ensure that controls are effective and efficient in both design and operation. This is achieved through the environmental performance outcomes, environmental performance standards and measurement criteria that are described for each environmental impact or risk. Monitoring and review are described in detail in the Implementation Strategy (Section 8).

3 Description of the Activity

The proposed scope of the Drilling Program covered by this EP consists of:

- Drilling of up to six wells in Otway which may include a combination of:
  - Drilling of up to five exploration or appraisal wells in exploration licences VIC/P73 and/or VIC/P43.
  - Drilling of up to two exploration wells in exploration licence T/30P.
- Drilling of up five wells in Bass which may include a combination of:
  - Drilling of up to four appraisal wells in retention licences T/L5, T/RL4 and/or T/RL5.
  - Drilling, testing (contingent), and completing one infield well (Yolla 7) in production licence T/L1.

Plugging, abandonment and removal of well infrastructure below the mudline for five legacy suspended subsea exploration wells as per Table 3-1.

3.1 Operational Area

The Operational Areas are where planned activities will occur. The Operational Areas are shown in Figure 3-1 for Otway and Figure 3-2 for Bass.

The Operational Areas and indicative well locations for new wells and locations for the suspended P&A wells are shown in Figure 3-1 for Otway and Figure 3-2 for Bass, with the coordinates of the suspended P&A wells in Table 3-1: P& A Well Locations

For all new wells, Beach is in the process of determining the final drilling locations. The process of selecting a final drilling location involves the analysis of the existing reprocessed seismic data (no new seismic data is acquired for this program), interpretation of data to select prospects with high probability of success, and cost effectiveness. The timing for completion of this process is expected to be in Q2 2024. Consequently, a broader Operational Area has been used to ensure that the potential impacts and risks associated with drilling activities at all potential well locations are assessed.

Drilling and P&A activities will be undertaken within a 3 km radius around the well sites whilst the drill rig is moored on location. The 3 km radius encompasses both the outer extent of mooring equipment on the seabed, and the 500 m petroleum safety zone (PSZ).

Table 3-1: P& A Well Locations

Wells	Title	Location		Water depth (m)
		Latitude	Longitude	
Otway				
Geographe 1	Vic/L23	39° 06′ 41.811″ S	142° 55′ 43.877″ E	~85 m
Thylacine 1	T/L2	39° 14′ 22.281″ S	142° 54′ 49.136″ E	~101 m
Bass				
Trefoil 1	T/L5	39° 51′ 44.12″ S	145° 22′ 30.73″ E	~68.9m
White Ibis 1	T/RL4	39° 57′ 44.218″ S	145° 15′ 22.123″ E	~74.4m
Yolla 1	T/L1	39° 50′ 14.24″ S	145° 48′ 24.98″ E	~90.1m

3.2 Activity Timing

The estimated timings for each activity are:

- Drilling: 30 - 40 days per well.
- Completion: 15 - 20 days for one well (Yolla 7).
- Plug and abandonment: 15 – 20 days per well.

Activities will be conducted on a 24 hours per day, 7 days per week basis. The above timings equate to approximately 560 days of activity for the full Drilling Program and will be undertaken within the period of 1 November 2024 to the 31 December 2028.

3.3 Drill Rig

The Drilling Program is proposed to be undertaken using a single moored semi-submersible drill rig with a thruster assisted mooring system. The Transocean Equinox, has been used to inform relevant aspects of the environmental impact and risk assessment (Section 7) of this EP, as either this drill rig or one with similar capabilities, design and capacities will be used for the Drilling Program.

The drill rig may have ~140 persons on board (POB) at any given time.

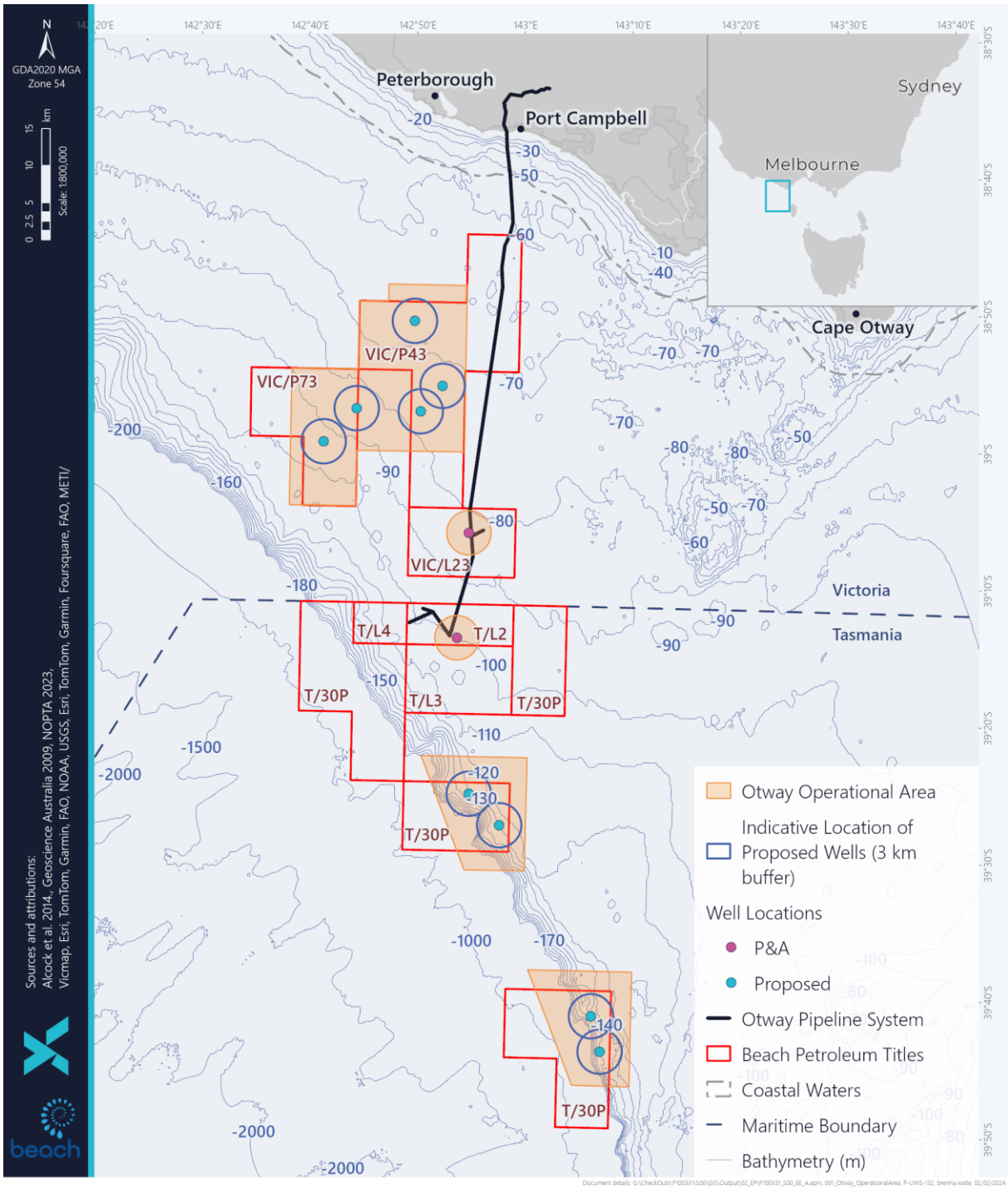


Figure 3-1: Drilling Program Otway Operational Area

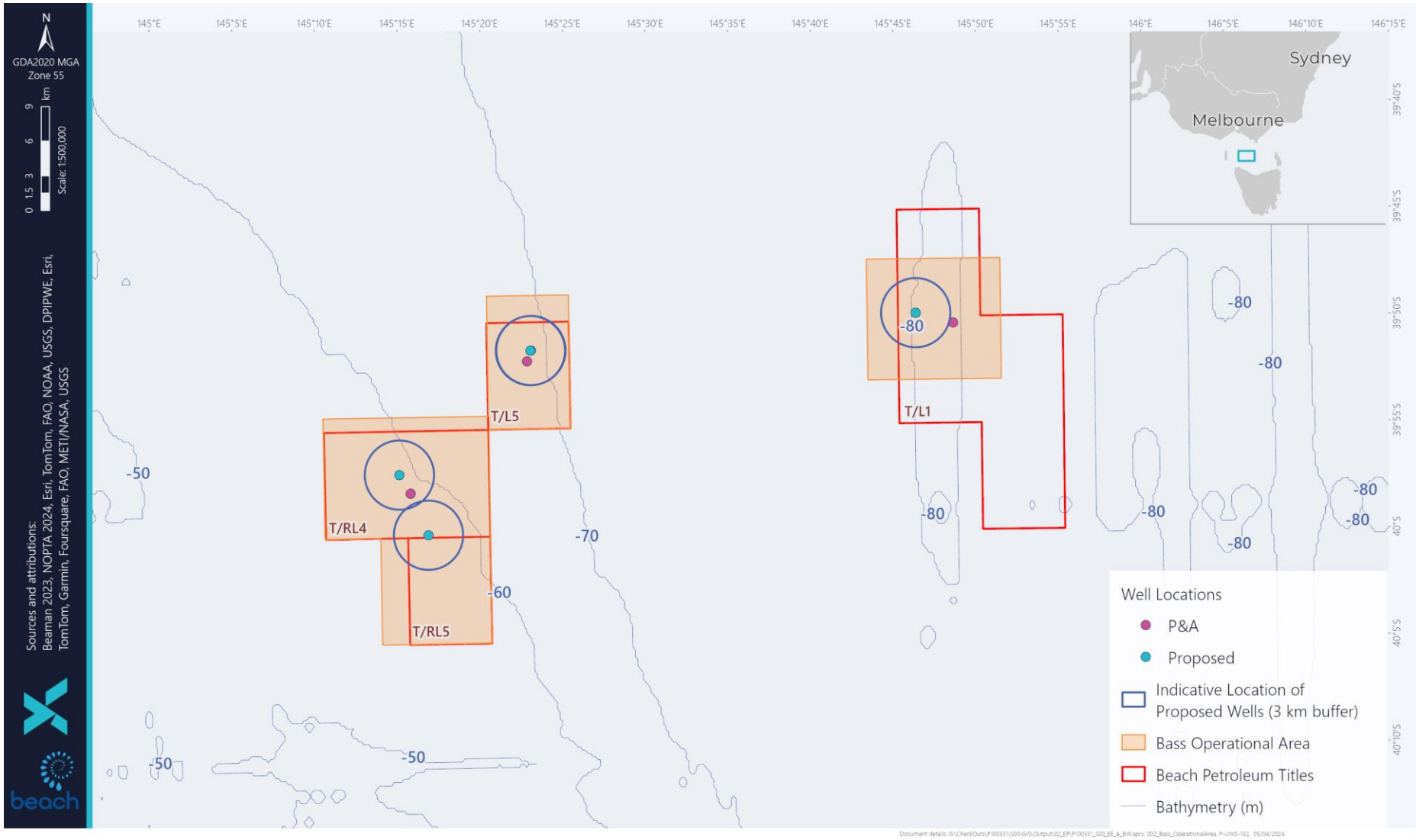


Figure 3-2: Drilling Program Bass Operational Area

3.4 Rig Positioning

The drill rig will either mobilise to the required Operational Area with its own propulsion system or be towed by vessels and anchored or connected to pre-laid anchors prior to commencing activities. Anchors may be positioned (pre-laid) on the sea floor typically 1 month and up to 3 months prior to the rig being on location.

The drill rig will be moored with 8 or 12 anchors, with weight ranging from 15 to 30 MT each, resulting in an individual footprint of ~30 m^2 to 60 m^2. A mooring analysis will be undertaken to determine specific mooring requirements for each well location. The mooring analysis will incorporate the results from the geophysical and geotechnical survey obtained prior to rig mobilisation and which is subject to a separate EP (Offshore Gas Victoria Geophysical and Geotechnical Seabed Survey Environment Plan CDN/ID V-1000-P1-MP-0011).

Anchors are attached to the rig by a chain or chain / wire system. The anchors will be positioned at ~2 km (ranging from 1.5 km – 2.1 km) from the rig. The rig is equipped with a thruster assisted mooring system to mitigate mooring fatigue in heavy sea states / poor weather conditions.

Transponders may be required to inform anchor positioning. The transponders for mooring are called ADAPS (Anchor Distance And Positioning) – they can be acoustically interrogated for GPS position and anchor orientation. They are affixed to the anchor so are deployed and recovered in the same timeframes as the anchor installation.

Each pre-laid anchor consists of:

- Anchor covering an area ~60 m^2
- Anchor chain including swivels and shackles. Typically, the anchor chain consists of 82 – 120 mm links. 300 m of chain is laid on the seabed with a pennant wire in the water column attached to a surface buoy. This equates to ~87 m^2 footprint based on the chain being ~ 290 mm wide.
- Surface buoy with a navigation light.

The total footprint for each anchor and chain will be less than 200 m^2. However, co-located wells sharing a common drill centre may use the same anchors with the drill rig moving across to the new well location.

An array of long baseline and/or ultra-short baseline transponders may be installed on the seabed, within a radius of 500 m from the well locations, for metrology and positioning. This positioning system is only expected to be used on selected wells and only if required.

Transponders, if used, will be moored to the seabed by a clump weight. Clump weights are typically made of cement or steel with a footprint of ~0.2 m^2. On completion of the positioning operation, transponders and associated equipment will be removed.

3.5 Blow-out Preventer Installation and Function Testing

A blow-out preventer (BOP) consists of a series of hydraulically operated valves and sealing mechanisms (annular preventers and ram preventers). During drilling and P&A operations, drill fluid is circulated up the marine riser to the drill rig during drilling and P&A. The BOP is used to close in the well in the event of an influx of hydrocarbons from the formation into the wellbore. The annular and ram preventers are

used to shut in around various tubulars in the well, while the blind shear rams are designed to shear the pipe and both types of preventers will seal the well.

Once the BOP is installed, regular function and pressure tests are undertaken to confirm continued operability. Function tests are generally undertaken every 7 days, and pressure tests on a 21-day basis, in accordance with industry standards and the Drilling Contractor's maintenance system. Function testing is undertaken by activating the hydraulic control system onboard the drill rig to confirm functionality of the BOP systems, whilst a pressure test is undertaken to verify the seals on the BOP stack.

The BOP control system discharges control fluid into the sea upon operation. A full function test to close and open all ram and annular preventers discharges ~2,200 L of potable water with 1 to 3% water-soluble control fluid. Smaller volumes are discharged for pressure testing and when latching and unlatching the BOP at the start and end of each well.

Tethers may be used to arrest the BOP lateral movement. There are several types of BOP tethering system, selection is pending on engineering studies to inform both the necessity and type of tethering.

A typical tethering system would comprise of approximately four gravity anchors (25 to 50 MT each) or suction piles. Each gravity anchor or pile is located within ~25 - 40 m of the well and is attached to the BOP equipment via tethers. Gravity anchors laid on the seabed have a footprint of ~25 m^2 per anchor. Suction piles penetrate the seabed and have a smaller footprint than gravity anchors. Tethering systems, if required, would be temporarily placed on the seabed and would be recovered prior to the rig leaving the well location.

Greater detail on the performance standards for the BOP system, inclusive of design, functionality, and preventative maintenance are included in a Well Operations Management Plan (WOMP), which must be accepted by the regulator prior to drilling commencing.

3.6 Exploration and Appraisal Well Drilling Activity

An overview of the indicative drilling design and process for the exploration and appraisal wells is described in this section. This process is subject to change, depending on individual well design requirements and the final location of the wells.

The top-hole well sections (conductor and surface hole) will be drilled without a marine riser, which is standard practice. The cuttings (rock chips) and drilling fluids from this section will be discharged directly to sea. A marine riser and BOP will be installed and connected to the rig to facilitate the drilling of the deeper well sections once the surface casing is cemented in place. Once the riser and BOP are installed, drilling fluids and cuttings will be returned to the drill rig via the marine riser where the drilling fluids and cuttings will be separated using solids control equipment.

3.6.1 Drill Fluids and Cuttings Handling and Disposal

Drilling fluid performs several functions including cooling and lubrication of the drill bit; transportation of drill cuttings to the surface; and maintaining hydrostatic pressure in the wellbore, thus preventing the influx of hydrocarbons from the formation into the wellbore, drilling fluids are the primary well control barrier.

A summary of the drilling fluids and estimated cuttings discharges are described in Table 3-2.

The top-hole sections will be drilled with seawater and pre-hydrated gel sweeps, with discharge to the seabed. Gel sweeps are typically comprised of seawater with high viscosity pre-hydrated bentonite. The seawater may be treated with caustic soda (NaOH) and/or soda ash (Na_2CO_3) to increase pH and alkalinity, facilitating the development of the fluid properties required to drill the hole section.

Intermediate and reservoir-hole sections will be drilled with water-based drill fluids (WBDF). Drill water (fresh water) is the major component of WBDF to which bentonite clay, barite, brine and/or gellants (such as guar gum or xanthum gum) have been added. The drill water may be treated with caustic soda (NaOH) and/or soda ash (Na_2CO_3) to increase pH and alkalinity, facilitating the development of the fluid properties required to drill the hole section.

Once the riser and BOP are installed, drilling fluids and cuttings will be returned to the drill rig via the marine riser where the drilling fluids and cuttings will be separated using solids control equipment. The solids control equipment comprises a series of shale shakers that remove coarse cuttings from the drilling fluids. After processing by the shale shakers, the recovered fluids, that have been separated from the cuttings, are directed to centrifuges, which are used to remove the finer solids. The cuttings and fine solids are discharged below the water line and the reconditioned fluids are recirculated into the system.

A summary of the drilling fluids and estimated cuttings discharges are detailed in Table 3-2.

Bulk dry products (bentonite and barite) are transported to the drill rig via supply vessels and transferred to dry bulk storage tanks. During the transfer process, the holding tanks are vented to atmosphere, resulting in small amounts of dry product being discharged from venting pipes located under the rig.

Liquid drilling fluid, brine, and drill water are transferred to the drill rig from supply vessels and stored in tanks and pits. Dry and liquid additives are mixed into the fluid system from the bulk tanks, sacks or containers.

The Beach Drilling Program forms part of a rig consortium campaign that will be shared across Beach's Bass and Otway assets, along with other titleholders who also have drilling activities planned in the region. The final operator in the rig consortium campaign will minimise remaining bulk materials onboard both the rig and vessels to as low as reasonably practicable, ensuring well integrity and rig safety are maintained. At the end of the rig consortium campaign in the region, should the next rig operator not want any remaining dry bulk barite or bentonite these materials would be discharged to the marine environment once by the last titleholder using the rig. This discharge would occur only once throughout the multi-operator rig consortium campaign with discharges minimised as noted.

Table 3-2: Indicative Well Design

Hole size	Conductor/ casing/ liner size	Approx. MDRT (m) / TVD (m)	Fluid type	Maximum. cuttings volume (m^3)	Fluid discharge location	Cuttings discharge location
42"	36"	~280 m	Seawater & PHG sweeps	161 m^3	Seabed	Seabed
17-1/2"	13-3/8"	~1700 m	Seawater & PHG sweeps	232 m^3	Seabed	Seabed
12-1/4"	9-5/8"	~3850 m	WBDF	164 m^3	Sea surface	Surface – with residual WBDF

Hole size	Conductor/ casing/ liner size	Approx. MDRT (m) / TVD (m)	Fluid type	Maximum. cuttings volume (m^3)	Fluid discharge location	Cuttings discharge location
8-1/2"	5"	~4430 m	WBDF	21 m^3	Sea surface	Surface – with residual WBDF

3.6.2 Cementing

Cement is used to seal the casing following drilling of each hole section and as a result isolate any hydrocarbon bearing formations from the environment. Cement discharges to the marine environment may occur from the following:

- Prior to the commencement of cementing operations, the cementing unit is tested resulting in a very small discharge of cement slurry to sea.
- After a string of casing or liner has been installed into the well, a cementing spacer is pumped to flush drilling fluids and filter cake from the well to allow a good cement bond to be formed with the formation. During riserless drilling, the spacer is displaced by the cement slurry and discharged directly to the seabed at the mudline.
- Once the riser is installed, the pre-flush volumes are such that the spacer will remain downhole or very minor volumes of cement may be returned to the drill rig and discharged to sea. Upon completion of each cementing activity, the cementing head and blending tanks are cleaned which results in a release of cement contaminated water to the ocean.
- If mixed batches of cement spoil within the cementing unit, or there is a problem during the cementing operation, cement slurry will be either flushed from the cement unit or circulated out of the well and discharged to sea.

Cement discharge volumes are detailed in Table 7-12.

Bulk dry cement is transported to the drill rig via supply vessels and transferred to dry bulk storage tanks. During the transfer process, the holding tanks are vented to atmosphere, resulting in small amounts of dry cement being discharged from venting pipes located under the rig.

The Beach Drilling Program forms part of a rig consortium campaign that will be shared across Beach's Bass and Otway assets, along with other titleholders who also have drilling activities planned in the region. The final operator in the rig consortium campaign will minimise remaining bulk materials onboard both the rig and the vessels to as low as reasonably practicable, ensuring well integrity and rig safety are maintained. At the end of the rig consortium campaign in the region, should the next rig operator not want any remaining dry cement these materials would be discharged to the marine environment by the last titleholder using the rig. This discharge would occur only once throughout the multi-operator campaign with discharges minimised as noted.

3.6.3 Formation Evaluation

During drilling, the formation is evaluated to determine the presence and quantity of hydrocarbon within the target reservoir. This information is gathered real-time from Logging Whilst Drilling techniques, wireline logging and mud logging.

Vertical Seismic Profiling (VSP) or check-shot surveys are not within the scope of this EP. VSP, if planned, will be included in the scope of a separate EP.

3.6.4 Well Suspension

One of the outcomes for an exploration or appraisal well is to suspend the well with temporary cement plugs for future re-entry and completions or to suspend the well with completions and subsea tree for future tie-in to the facilities should the prospect be economically viable for future development.

Completions and suspension with a subsea tree for exploration or appraisal wells is not part of this EP except for Yolla 7 which is described in Section 3.7.

The exploration and appraisal wells will be suspended in accordance with a NOPSEMA-accepted WOMP. Barriers will be installed and verified to isolate the formation(s) and for ensuring well integrity is maintained while the well is temporarily suspended prior to completions.

3.6.5 Exploration and Appraisal Well Plug and Abandonment

If an exploration or appraisal well is not economically viable then it will be permanently plugged and abandoned (P&A'd) as part of this Drilling Program. P&A operations involve setting a series of permanent cement and mechanical plugs (barriers) within the wellbore, including plugs above and between any hydrocarbon bearing intervals identified for isolation, at appropriate depths in the well and at the surface. These cement and mechanical plugs will be installed in compliance with the Beach Well Engineering and Construction Management System (WECS) and tested to verify their integrity as per the WECS and the NOPSEMA accepted WOMP.

During well abandonment operations, as with other cementing operations (see Section 3.6.2), the majority of cement remains down-hole, but minor volumes may be discharged to the environment as detailed in Table 7-12.

Following P&A operations and associated verification of permanent barriers, the wellhead is cut below the mudline (~1.5 m below seabed) with either a mechanical or abrasive cutting tool and subsequently removed. The cutting process produces a small amount of metal shavings (swarf), some of which may remain on the seabed.

An ROV seabed survey will be conducted to ensure appropriate seabed clearance prior to the rig leaving the well location.

3.6.6 Contingent Activities

3.6.6.1 Re-spud of Wells

The re-spud of wells may be required for unforeseen circumstances (i.e., unable to retrieve stuck pipe, conductor out of installation specification, encountering unexpected shallow hazards). The re-spud well will be the same well design as the planned well and typically located within the same mooring pattern therefore not requiring an additional rig move. The original well would be permanently plugged and abandoned and any wellhead removed, per the process described in Section 3.6.5, prior to moving the rig and re-spudding.

3.6.6.2 Side Track

A side track contingency is included for the unlikely event where the geological result is poor and there is a requirement to assess an alternative geological target with the same wellbore or where there has been a stuck pipe downhole event that proves to be not retrievable after multiple attempts.

A standard approach for side track is to plug and abandon the original wellbore with cement plug(s) in accordance with regulatory requirements, followed by setting a high-density cement plug or a mechanical whipstock inside the previous casing. A window would be milled through the original casing (along with cement behind) to create an opening for the new side track wellbore. The drilling assembly would be guided through the window to continue drilling to target depth. The activities subsequent to the side track would be the same as was planned for the original wellbore. The window milling operations would generate some metal swarf which will be handled on the rig and disposed of onshore.

3.7 Yolla 7

The Yolla 7 well will be drilled as per the exploration and appraisal wells following sections:

- Section 3.6.1: Drill Fluids and Cuttings Handling and Disposal
- Section 3.6.2: Cementing Operations
- Section 3.6.3: Formation Evaluation

In addition, the Yolla 7 well, if determined to be feasible for production, will be completed and tested (contingency) as per the following sections.

3.7.1 Completions (Yolla 7 only)

Well completion is the process of preparing a well for production. It involves installing production and flow control equipment, and completing the final construction of the well, including:

- Installation of a subsea production tree (an assembly of valves, spools, and fittings used to regulate hydrocarbon flow within a well). Trees will be located on the seabed.
- Installation of the sand face completion, typically a production liner across the producing reservoir interval.
- Wellbore clean-up where the drilling fluid is displaced from the wellbore and replaced with a filtered completion fluid, typically brine. Completions brine consists of:
    - Sodium chloride (NaCl) or a NaCl / sodium bromide (NaBr) blend, with a density to maintain a suitable overbalance and partially inhibited as required.
    - Viscosifiers and surfactants to aid in removing and lifting drilling fluid residue and debris from the wellbore.
    - Biocide and/or oxygen scavenger to prevent contamination of the formation and any subsea or surface process equipment with anerobic or aerobic bacteria and to limit their growth.
- Evaluation of the cement bond for barrier and/or zonal isolation confirmation.

- Installation of the upper completion consisting of the production tubing, tubing hanger, surface-controlled subsurface safety valve and production packer and downhole monitoring capability and flow control equipment.

- The production annulus will be displaced to a packer fluid before setting the production packer. Once packer is set, the packer fluid will be isolated within the production annulus with the intention for it to remain in place throughout the well's production life to protect casing/tubing from degradation. At the same time, the tubing will be displaced to an underbalance fluid (such as base oil, diesel, or nitrogen), completion brine from the tubing then will be displaced and returned to the rig brine tanks and may be stored or diluted and discharged and this volume forms part of discharge (a) below. The packer fluids discharges are as per discharge (b) below.

- The production packer will be set, and the completion tested to confirm well integrity, prior to perforating and either suspending the well or undertaking well testing and clean-up operations.

- Perforating cemented production casing or liner to create communication from the reservoir into the wellbore.

- A suspension fluid will be place inside the production tubing above the subsurface safety valve and throughout the subsea tree production bore. Excess un-used suspension fluids will be discharged as per discharge (c) below.

- To inhibit marine growth or corrosion, a biocide and corrosion inhibitor may either be injected or placed within the tree cap. The tree cap can hold ~210 L of dilute corrosion / biocide mixture. Typically, the corrosion / biocide mixture is at a ratio of ~3 L corrosion inhibitor, 0.25 L biocide, and 207 L water. At this stage, there is no release to the environment; however, when the tree cap is removed at a later date for subsequent tie-in activities, the fluid will be discharged to the marine environment.

- Following well completions or clean-up / rig-based flow back (contingency) operations the well is secured, and integrity confirmed with suspension barriers as per the NOPSEMA-accepted WOMP. The well is then handed over to Production for subsequent tie-in activities to connect the well for long term production. The tie-in activities are covered by a separate EP.

Discharges:

a) Completion fluids (consisting of completion brine and any formation water or condensate present in the wellbore). These will be circulated back to the rig for treatment prior to discharge. Expected volume of discharge is ~ 400m^3 with ~16m^3 being formation water. the completion fluids will be tested and discharged only if the oil in water content is below 30 ppm. Fluid not meeting this criterion will be stored for onshore disposal.

b) Excess packer fluid left at the end of completion operations will be discharged (~100 bbls/16 m^3). The completion packer fluid contains brine (chlorides of calcium, potassium or sodium or a bromide solution) with additives that may include amine-type corrosion inhibitors, oxygen scavengers, biocide, and soda ash or caustic soda for pH (alkalinity) control.

c) An excess of suspension fluid will be discharged (~50 bbls/8 m^3). The suspension fluid typically includes a solution of 50% water and 50% hydrate inhibitor (monoethylene glycol (MEG)).

d) Cartridge filters used to filter the completion fluid prior to, during the clean-up operations, and any subsequent circulating operation. The filters will be returned to shore for suitable disposal. Any debris recovered during the clean-up operations and completion program such as metal shavings and rubber material will be consolidated and sent for onshore disposal.

3.7.2 Well Testing (Contingent for Yolla 7 only)

Well flowback and testing via the rig is not planned for the exploration and appraisal wells in this EP. Well flowback and testing is a contingency operation only for Yolla 7.

A well flowback and test operation is performed after the well has been completed and is the process of removing well construction fluid from the well and bringing reservoir fluid (condensate and/or gas) to surface. The objective of this activity is to remove well construction fluid, so this is not received by the Yolla A platform and the Lang Lang Gas Plant, and if necessary, undertake production testing to evaluate the reservoir potential and understand reservoir fluid properties.

The flowback fluid is typically a mixture of completion fluid (completion brine and any formation water or condensate present in the wellbore), underbalance/low density fluid (base oil, diesel or nitrogen) and remnants of WBDF. Depending on the formation and well construction process there could also be solids such as formation and perforating debris.

Well testing may be undertaken for up to 48 hours depending on the well geometry, the objectives of the clean-up and the test operation. Table 3-3 details the predicted emissions and discharges for the contingency Yolla 7 well clean-up and test operations.

The majority of fluids returned from the wellbore and formation are flammable and will be sent to the flare and burnt off. Non-flammable fluids, including any produced formation water or completion brine will be discharged to the marine environment via the well test water filtration treatment package to reduce the oil in water content to below 30 ppm prior to overboard discharge. Fluid not meeting this criterion will be stored in tanks for later onshore disposal.

Table 3-3: Predicted Yolla 7 Well Completion and Contingency Testing Emissions and Discharges

Emission Parameter	Amount	Discharge Location
Volume of gas (MMscf/day)	80	Atmosphere via flare
Volume of water (bbl)	450	Sea following filtration
Volume of condensate (bbl)	3,600	Atmosphere via flare
Volume underbalance cushion (bbl)	450	Re-use or to atmosphere via flare
Volume of brine, well flow back (bbl)	150	Atmosphere via flare, re-use or sea following filtration
Volume of methanol (L)	360	Atmosphere via flare
Volume of MEG (L)	720	Atmosphere via flare
Volume of nitrogen (L)	36,400	Atmosphere via flare
LPG Pilot Light (L)	265	Atmosphere via flare
Duration of well testing (flaring) (hours)	~48	N/A

3.8 Plug and Abandonment of Legacy Suspended Wells

3.8.1 Infrastructure Overview

P&A activities will be undertaken on the five legacy suspended subsea exploration wells. The wells were all drilled vertically to explore prospective geological structures and subsequently suspended as potential future production wells. Drill stem tests were conducted at the time of original drilling to evaluate the reservoir potential in Trefoil 1, White Ibis 1, and Yolla 1. None of the wells have been completed or used for commercial hydrocarbon production at any point. Therefore, none of the wells are connected to existing pipeline or production facilities. A full casing string or liner was cemented across the open hole section in each well, except for White Ibis 1. Each of the wells was suspended with the placement of a number of cement plugs as barriers in the wellbore.

A summary of each well to be P&A'd is provided in Table 3-4.

Table 3-4: Summary of Legacy Suspended Subsea Exploration Wells

Well Name	Well history	Current Status	Insitu Fluids	Well Infrastructure
Geographe 1 Thylacine 1	Drilled and suspended in May/June 2001. Drilled with WBDF. The well was never completed, nor produced.	The well was suspended with multiple cement barriers.	WBDF only, seawater, inhibited KCl brine.	Subsea wellhead, ROV retrievable debris cap (non-pressure containing), and permanent and temporary guide base.
Trefoil 1	Drilled and suspended in Dec 2004. Drilled with WBDF. The well had a drill stem test, but never completed, nor produced.	The well was suspended with multiple cement barriers.	Inhibited NaCl brine, biocide, corrosion inhibitor, oxygen scavenger.	Mudline suspension, ROV retrievable debris cap (non-pressure containing).
White Ibis 1	Drilled and suspended in July 1998. Drilled with WBDF. The well was never completed, nor produced.	The well was suspended with multiple cement barriers.	Inhibited KCl brine, corrosion inhibitor.	Subsea wellhead, ROV retrievable debris cap (non-pressure containing), permanent guide base with 2 x guidepost remaining.
Yolla 1	Drilled and suspended in October 1985. Drilled with WBDF. The well had a drill stem test, but never completed, nor produced.	The well was suspended with multiple cement barriers.	WBDF only, seawater, inhibited KCl brine.	Wellhead, ROV retrievable debris cap (non-pressure containing), Guidelineless Re-Entry Assembly Drilling Template

3.8.2 Suspended Wells Inspection

A program of General Visual Inspections of each suspended well using a ROV has been in place since 2014. The Beach Well Integrity Standard mandates that inspections are undertaken every 2 years to confirm that well integrity is maintained.

An ROV wellhead preparation and inspection campaign was undertaken in June 2023 to assess the condition of the subsea wellhead and interfaces in advance of the rig arriving.

3.8.3 Activity Overview

P&A activities of the legacy suspended subsea exploration wells, including designing and installing permanent well barriers, will be completed per industry best practice (OEUK Guidelines) and in accordance with the NOPSEMA accepted WOMP.

Abandonments for each well will be performed sequentially through a marine riser and BOP. The P&A sequence for each well will depend on existing well design and integrity, casing cement quality and well condition upon re-entry.

Fluids will include those within the well, as well as clean fluids and chemicals specifically selected for the permanent well abandonment program.

The generic planned well abandonment will include the following steps for each well:

1. Position the drill rig over the well and anchor or connect to pre-laid anchors (location dependent) (Section 3.4)
2. Clean and prepare wellhead (as required) for landing the BOP (Section 3.8.4).
3. Run and land BOP on marine riser and interface with wellhead, connect with BOP tether system (if required) (Section 3.5).
4. Displace well with clean overbalanced WBDF (Section 3.8.5).
5. Drill out upper cement plug (s) to allow placing of a permanent cement barrier adjacent to caprock. (Section 3.8.6)
6. Set and verify abandonment plugs (Section 3.8.7). Recover BOP and marine riser.
7. Remove and recover wellhead and associated infrastructure to clear the seabed (Section3.8.8)

3.8.4 Clean and Prepare Wellhead

Although unlikely, some wellhead equipment may require scale dissolver or calci-wash for removal of scale on the wellhead. Typically, this is applied in batches of ~320 L applied over 1 hour. Total discharge can be up to 10 m^3.

3.8.5 Displace Well with Clean Overbalance WBDF

During well abandonment activities, fluids will be circulated in and out of the well to maintain a hydrostatic barrier over the wellbore pressure, and to clean the well in preparation for cementing. Fluids will include those insitu in the well and clean overbalanced fluids specifically selected for the well abandonment program.

The clean overbalanced fluid will be WBDF, consisting of barite, brine viscosifier, biocide and which may be discharged when drilling out the cement plugs as per Section 3.8.6

The insitu fluids discharge will include up to ~130 – 150 m^3 per well of inhibited water (corrosion inhibiter, biocide, and oxygen scavenger) and KCl brine. Due to the wells not being completed and commercially produced, and temporarily suspended with barriers in place, no hydrocarbons are expected to be in the insitu fluids.

3.8.6 Drill Out Upper Cement Plug (s) or a Cement Plug

Each legacy well is currently suspended with at least two cement plugs. The upper cement plugs are generally required to be drilled out to enable the permanent cement barrier to be properly placed adjacent to the regional caprock.

During the permanent plugging operation, if the permanent cement plugs do not pass the verification test, then drilling out of these cement plugs will be required so the cement plug(s) can be reinstalled. WBDF will be used, and the WBDF and cement cuttings will be processed through the drill fluids and cuttings handling system as described in Section 3.6.1, and discharged overboard. This will generate about 25 m^3 of cement cuttings per plug and use ~250 m^3 of WBDF.

3.8.7 Set and Verify Permanent Cement Barriers

The existing cement plug may be assessed by tagging and/or pressure testing as required. Wireline logs will be run to assess casing condition, annulus cement quality and position.

Wireline activities may include gamma ray and casing collar locator logging, ultrasonic cement bond logging and other tools such as drifts, bridge plugs, cement retaining tool, punch perforators or cutters etc. and will be performed through the marine riser and BOP with appropriate isolation barriers in place.

Permanent cement plugs will be placed adjacent to the caprock. Cement discharges will be as per the discharges described in Section 3.6.2.

Where required, a series of perforations and/or cuts to the casing (s) may be made, followed by pumping specially formulated quantities of cement slurry according to the operations program and NOPSEMA accepted WOMP. To remediate existing cement, the well including annular spaces behind casing are displaced with clean brine. Returns at surface will include excess cement spacer, the insitu fluids, and debris solids (e.g. cement cuttings). Insitu fluid details are outlined in Section 3.8.5.

Once permanent barriers are installed and verified, the BOP is recovered.

3.8.8 Removal and Recovery of Infrastructure

Following P&A operations and verification of permanent barriers, the wellhead is cut with either a mechanical or abrasive cutting tool and removed below the mudline (~1.5 m below seabed). The cutting process produces small amount of metal shaving (swarf), some of which may remain on the seabed. Subsequently, a shallow surface to seabed cement plug will be set as per approved WOMP (Section 3.8.7)

Equipment associated with the wells such as wellhead, permanent and temporary guide bases, guidelineless re-entry assembly, remaining guideposts, cut conductor and casing section(s) will also be removed for onshore disposal.

For White Ibis 1, minor dredging with ROV dredging tools will be required to excavate the seabed from around the wellhead to enable the wellhead to be cut.

An ROV seabed clearance survey will be conducted following P&A and removal of associated infrastructure to confirm all infrastructure on the seabed has been removed, returning the area to original condition as much as possible.

3.8.9 Contingent Activities

The following activities may be required because of operational or technical issues during P&A. These additional activities have been considered within the relevant impact assessment sections and do not represent significant additional risks or impacts but may generate additional small volumes of drilling fluids and drilled cement being operationally discharged, which have been assessed as part of the petroleum activity.

3.8.9.1 Cut and Pull, Milling and Wellbore Fishing Operations

If the cement on the outside of the casing does not meet well barrier requirements, casing or liners may need to be removed either by cutting and pulling or milling. These operations are done through the marine riser with milling debris returned to the rig (through a swarf handling system for milling operations) and will only be performed if necessary.

Milling operations involve removing steel casing, annulus cement and formation to expose formation (caprock). The methods used include milling tools that create chips or ribbons of steel (swarf), chips of cement and chips of formation. Milling is typically performed at a controlled rate (1 to 1.5 m/hr), to enable steel swarf to be removed effectively from the milling site.

As the steel swarf within the milled fluids is hard and sharp, the fluids from the well will be passed through specific swarf handling equipment, which generally includes magnets, that separate steel from the fluid before being processed through the solids control equipment on the rig. The milling fluids, including an additional ~2 m^3 of swarf, ~3 m^3 of drilled cement and ~3.5 m^3 of formation rock, will be discharged overboard per 100 m interval if milling is required. As a result of restricted milling speeds, the rate of swarf and cement will be generated over several days (the rate is expected to be about 50 m per 18 hours).

The metal shavings gathered from swarf handling equipment as above will be sent ashore for disposal.

Recovered WBDF will be circulated as part of the brine system with intermittent discharges during and at the end of the activities.

Casing or liners and other equipment that are removed from the well will be transported to shore for onshore disposal.

3.9 Routine Support Operations

3.9.1 Vessels

Vessel operations include:

- Rig moves between well locations and rig positioning.
- Deployment and retrieval of mooring and BOP tethering equipment (if required).
- Standby support to monitor and maintain the 500 m rig PSZ from errant vessels.
- Transfer of goods and equipment between the shore base and rig.

- Facilitating site and equipment inspection and operation of rig positioning equipment.

The rig will be supported by up to three support vessels with one vessel on standby within the operational area (outside the 500 m rig PSZ) at any given time and the other two vessels outside the operational area transporting cargo between port and the rig or performing other supporting duties of the rig.

Vessels only enter the 500 m rig PSZ under instruction from the rig when transferring cargo to the rig or supporting specific operations. Support vessels generally have ~15 POB at any given time.

Support vessels maintain station-keeping via dynamic positioning (DP) during the drilling activity therefore no anchoring is required.

Based on a review of operational details from Beach Energy's Otway drilling campaign, conducted from February 2021 to July 2022, resupply operations are predicted to occur near-daily for an average duration of 3 hours.

3.9.2 Helicopter

Helicopters are the primary form of transport for personnel to and from the drill rig and may also be used during emergency situations, including operational and scientific monitoring in the event of a hydrocarbon spill. Helicopters will be available to service the rig up to 7 days per week for the duration of the drilling program, normally operating in daylight hours only.

Helicopter operations within the Operational Area are limited to landing and take-off directly to and from the rig helideck.

Offshore refuelling of the helicopters whilst onboard the rig is not planned, however, may be undertaken if required.

3.9.3 Remotely Operated Vehicle

An underwater remotely operated vehicle (ROV) is a tethered underwater vehicle deployed from a vessel or drill rig. ROVs are unoccupied, highly manoeuvrable and operated by a crew aboard a vessel or rig.

ROVs are equipped with a video camera and lighting and can monitor the subsea infrastructure and the surrounding environment. ROVs are also used to deploy specialist tooling and equipment. Tooling and equipment may be operated with the use of electrics or hydraulics. Hydraulics on ROVs are closed system, where hydraulic fluid is circulated to move components and the system is designed not to release hydraulic fluid.

The ROVs will be housed on the deck of a vessel and / or drill rig and are unlikely to be temporarily parked on the seabed during the drilling program.

ROVs will undertake:

- Pre and post-activity site surveys.
- Assist in installation and removal of subsea equipment.
- Equipment deployment, monitoring and retrieval.

- Tool deployment and operation (dredgers, cutters etc.).
- BOP activation under emergency conditions.

4 Stakeholder Consultation

4.1 Summary

Beach has consulted relevant persons in the course of preparing this EP in accordance with applicable regulations, case law, guidelines, Beach policies and standards as set out in Section 8.

Beach understands that the purpose of consultation is to inform its understanding of the environment, including people and communities, the heritage value of places, and their social and cultural features, which may be affected by the proposed activities in this EP, and therefore refine or change measures proposed to reduce impacts and risks to an acceptable level and ALARP.

Consultation carried out in accordance with the regulations and guidelines etc, was designed to ensure that relevant persons were identified and provided sufficient information and a reasonable time period to allow them to make an informed assessment of the potential impacts and risks of the EP activities. Where objections or claims were raised about adverse impacts and risks of the EP activities, the consultation process enabled an assessment of impacts and risks and new or changed control measures to be adopted in the EP to reduce impacts and risk to an acceptable level and ALARP.

Beach has provided sufficient information in different formats including information sheets; website content; public notice advertisements; radio advertisements; consultations with Beach technical staff at information sessions and meetings. Relevant persons were advised of the purpose of consultation, provided multiple opportunities over a reasonable period to ask questions, raise concerns, and discuss control measures. Beach also included advice regarding sensitive information not being published.

Recognising the diversity of different categories of relevant persons and multiple regional locations, a range of engagement methods and locations were used including emailing information sheets and updates to all identified relevant persons; publishing information on Beach's website and new online consultation hub (Engage Beach); in person and online meetings with individuals and organisations; community and industry drop-in sessions.

Beach has continued to observe broad concerns about climate change and increasing concerns about marine seismic surveys. However, after explaining in direct consultations that the OGV Project and the Drilling and P&A activities do not include seismic acquisition, minimal additional information was sought, and minimal concerns raised. For the limited concerns raised, Beach has assessed their merits and identified any additional control measures as described in Section 4.12.

Consultation in the course of preparing this EP has been completed and Beach believes it has met the regulatory engagement requirements. Consultation in relation to implementing the activities in this EP (Section 4.16) and for the development of other EPs required for the OGV Project will continue. Should concerns or feedback about adverse impacts and risks from the activities in this EP be received after this EP has been accepted, Beach will assess the matters raised, and where a further measure or control may be required, Beach will apply its Management of Change process as detailed in Section 8.3.4.

4.2 Consultation Context

As an operator of offshore and onshore facilities in the Otway and Bass Basins, Beach has consulted with relevant persons and local communities regarding its projects for many years. Beach has been consulting with relevant persons since 2019 for its Otway Offshore Project for the preparation and implementation of several EPs relating to different project phases from drilling and P&A, connecting wells, and its ongoing offshore operations. Beach has also consulted with relevant person for its Bass

Basin activities including management of suspended wells, Drilling and P&A, seismic surveys, and its ongoing offshore operations. For further activities being planned in these basins and in the course of preparing this EP, Beach has continued to review its methodology for identifying relevant persons and refined its engagement methods in response to case law and growing community interest.

Consultation for this EP has been undertaken by providing relevant persons sufficient information on drilling activities and the P&A of suspended wells, that Beach has described in the simple collective term of 'Drilling Program'.

Beach has also provided information to relevant persons on the broader context for the Drilling Program by explaining that the activities are a part of several phases for Beach's Offshore Gas Victoria (OGV) Project for which additional EPs will be developed after further consultation. This includes previous submission of a Seabed Survey EP and an OPP for the OGV Project. Beach has undertaken this holistic approach as it gives relevant persons contextual information on why the Drilling Program is necessary to carry out subsequent activities in the OGV Project. This approach also demonstrates Beach's commitment to consulting transparently, consistent with NOPSEMA consultation guidelines and Beach's Community Engagement Standards.

4.3 Regulatory Requirements

Table 4-2 details where information in this EP has been included to demonstrate that Beach has met the consultation requirements in the OPGGS(E)R and NOPSEMA's Guideline GL2086 Consultation in the course of preparing an environment plan prepared to support clarity and transparency on the legal requirements including recent case law: Santos NA Barossa Pty Ltd v Tipakalippa [2022] FCAFC 193 (appeal decision). Beach has also reviewed the Federal court decision in Cooper v NOPSEMA (N0 2) [2023] FCA 1158. with regard to consultation requirements.

4.4 Guidelines Considered

The guidelines detailed in Table 4-1 were also considered in planning and delivering the consultation carried out in the course of preparing this EP:

Table 4-1: Consultation Guidelines Considered

Organisation	Guideline
NOPSEMA	GL2086 – Consultation in the course of preparing an environment plan – May 2023 (NOPSEMA Consultation Guidelines)
	GN1344 - Environment plan content requirements – January 2024
	GN1488 - Oil pollution risk management - July 2021
	GN1785 – Petroleum activities and Australian Marine Parks – January 2024
	GL1887 – Consultation with Commonwealth agencies with responsibilities in the marine area – January 2024
AFMA	Petroleum industry consultation with the commercial fishing industry
IAP2	Public participation spectrum
DCCEEW	Interim Engaging with First Nations People and Communities on Assessments and Approvals under the Environment Protection and Biodiversity Act 1999

Table 4-2: OPGGS(E)R, NOPSEMA Guidelines and How Requirements Met

Table note: the sections from the OPGGS(E)R have been updated to align with 2024 OPGGS(E)R. The NOPSEMA guidance has not been updated to align with OPGGS(E)R 2024.

OPGGS(E)R SECTION *(for consultation)*	**NOPSEMA GUIDELINE**	**HOW REQUIREMENTS WERE MET**
34 Criteria for acceptance of environment plan For section 34, the criteria for acceptance of an environment plan are that the plan demonstrates that: (g)(i) the titleholder has carried out the consultations required by section 25; and (g)(ii) the measures (if any) that the titleholder has adopted, or proposes to adopt, because of the consultations are appropriate	Section 25 establishes a duty on titleholders to carry out consultation in the course of preparing an EP. NOPSEMA's role is to assess whether or not the duty has been discharged, read particularly with section 34(g). In order to accept an EP under section 33, NOPSEMA must be reasonably satisfied (as per section 34) that the EP demonstrates the duty (to carry out consultation with relevant persons required by section 25) has been discharged and that the measures (if any) the titleholder has adopted, or proposes to adopt, because of the consultations are appropriate. **General principles for effective consultation** Consultation should be a genuine and meaningful two-way dialogue in which relevant persons are given sufficient information and time to allow them to make an informed assessment of the possible consequences of the activity on their functions, interests, or activities. The consultation process used for different activities may vary depending on a range of factors, certain key principles should be evident in the Environment Plan. **Consulting with groups where interests are held communally** Where interests are held communally, in accordance with tradition, the method of consultation will need reasonably to reflect the characteristics of the interests affected by the titleholder's proposed activity. **First Nations people / groups** First Nations groups, such as land councils and prescribed body corporates, may be relevant persons with a function that may be affected by the activities in the environment plan, but they may also provide advice in relation to who and how other First Nations groups or individuals should be consulted as relevant persons whose interests may be affected by the activities. A connection of traditional owners with sea country may constitute an interest for the purposes of section 25(1)(d). Titleholders must demonstrate to NOPSEMA that a reasonable opportunity to be consulted has been afforded to First Nation groups.	**Consultations required by Division 3** EP Section 4.15 Report on consultations EP Section 4.12 Assessment of merit of objections or claims shows approach to assessment of objections or claims. EP Section 4.13 Measures adopted as a result of consultation shows actual measures adopted as a result of consultation on this EP. EP Section 4.5 Principles of effective consultation shows the policy, standards and guidelines Beach applies when planning consultation. EP Section 4.5.1Consulting groups with communal interests show respect for consulting representative commercial fishers associations. EP Section 4.5.2 Consulting First Nations groups and peoples shows an informed and culturally sensitive approach to consulting First Nations groups holding formal representative roles in their communities.
25 Consultation with relevant authorities, persons and organisations, etc (1) In the course of preparing an environment plan (including a revised environment plan referred to in Division 5) a titleholder must consult each of the	**Identifying relevant persons** Titleholders are required to identify and consult with each authority, person or organisation who falls within the categories of relevant persons set out in section 25. Titleholders must clearly identify in their EP who is a relevant person and the rationale the titleholder has used to determine who they consider falls within that definition.	**Relevant Persons Identification** EP Section 4.6 Relevant Person identification methodology sets out a comprehensive methodology followed by research techniques, public notices, and other methods to identify relevant persons.

OPGGS(E)R SECTION *(for consultation)*	NOPSEMA GUIDELINE	HOW REQUIREMENTS WERE MET
following (a relevant person): (a) each Commonwealth, State or Northern Territory agency of authority to which the activities to be carried out under the environment plan may be relevant; (b) if the plan related to activities in the offshore area of a State – the Department of the responsible State Minister; (c) if the plan related to activities in the Principal Northern Territory offshore area – the Department of the responsible Northern Territory Minister; (d) a person or organisation whose functions, interests or activities may be affected by the activities to be carried out under the environment plan; (e) any other person or organisation that the titleholder considers relevant.	EPs should set out the processes that have been applied to identifying and determining who are relevant persons, as well as the processes undertaken for consultation. Authorities, persons, and organisations are to be identified on a case-by-case basis. Factors such as the nature of the activity, the environment in which the activity is being undertaken and the possible impacts and risks of the activity should be taken into account when determining whether the activity may be relevant to authorities, or determining who has functions, interests or activities that may be affected. Section 25, like most statutory consultation provisions, imposes an obligation that must be capable of practicable and reasonable discharge by the titleholder. It also involves 'some decisional choice' that the titleholder must make in identifying relevant persons and in how the consultation is undertaken. Processes for the identification of relevant persons must provide for sufficiently broad capture of ascertainable persons and organisations who may have their functions, interests or activities affected or that may be affected by the activity. Publication in appropriate media forms may be a reasonable tool to assist in the identification of relevant persons and inform the delivery of more targeted notices to potentially relevant persons. It is recognised that in any community consultation there will inevitably be persons within a group who could not participate for various reasons, however the absence of their participation would not invalidate the process provided reasonable efforts were made to identify the relevant persons and to consult with them. The process should include reference to multiple sources of information, such as publicly available materials, review of databases and registers, published guidance, previous history, as well as advice from authorities and other relevant persons. In some cases, relevant persons have developed guidance detailing their functions, interests, or activities and how and when they wish to be consulted on activities. Titleholders should take this guidance into account in developing consultation processes with relevant persons. Titleholders may also consider how they can create awareness of their activities to encourage potentially relevant persons to make themselves known to the titleholder. **Functions, interests or activities under section 25(1)(d)** The phrase "functions, interests or activities" in section 25(1)(d) should be broadly construed as this approach best promotes the objects of the Regulations, including that offshore petroleum and greenhouse gas activities are carried out in a manner consistent with the principles of ESD. The phrase is a composite one, each part of which has work to do in identifying relevant persons. **Functions**: refers to "a power or duty to do something" **Activities**: to be read broadly and is broader than the definition of 'activity' in section 5 of the Environment Regulations and is likely directed to what the relevant person is already doing	EP Section 4.7 Relevant persons identified shows the categories and names of relevant persons, alongside their functions, interests, and activities.

OPGGS(E)R SECTION *(for consultation)*	NOPSEMA GUIDELINE	HOW REQUIREMENTS WERE MET
	Interests: to be construed as conforming with the accepted concept of "interest" in other areas of public administrative law includes "any interest possessed by an individual whether or not the interest amounts to a legal right or is a proprietary or financial interest or relates to reputation"	
25 Consultation with relevant authorities, persons and organisations, etc. (2) For the purpose of the consultation, the titleholder must give each relevant person sufficient information to allow the relevant person to make an informed assessment of the possible consequences of the activity on the functions, interests or activities of the relevant person.	**Providing sufficient information under section 25(2)** Information provided must be sufficient to allow an informed assessment of the possible consequences of the activity on the functions, interests or activities of the relevant person. Again, the titleholder has a "decisional choice" to make in how information will be given to allow the "relevant person" to make the assessment contemplated by section 25(2). Titleholders should consider the functions, interests or activities of relevant persons and the impacts and risks that affect them when determining information requirements. The level of information necessary is likely to vary for different relevant persons and may depend on the degree to which a relevant person is affected. Different consultation processes may be required for relevant persons and organisations depending on information requirements. What constitutes sufficient information may differ depending on the relevant person(s) and the EP should demonstrate that the process was suited to the type of relevant person. Generic, targeted electronic mailouts or links to a webpage may not be sufficient. Information should be in a form that is readily accessible and appropriate for the relevant person being consulted. Materials provided may include written forms, pictorial or other graphics, verbal briefings or presentations, and the use of other technologies.	**Sufficient information** EP Section 4.8 Sufficient Information sets out the approach to preparing different types of information based on the potential impacts on the functions, interest or activities of the relevant persons. Includes a schedule of advertising and public information sessions held.
25 Consultation with relevant authorities, persons and organisations, etc. (3) The titleholder must allow a relevant person a reasonable period for the consultation.	**Providing a reasonable period under section 25(3)** Titleholders must provide a "reasonable period" for the relevant person to make an informed assessment of the possible consequences of the proposed activity on their functions, interests or activities and so they are able to respond with any concerns. The nature, scale and complexity of an activity as well as the extent and severity of potential impacts and risks on a relevant person's functions, interests or activities may inform what makes a reasonable period for consultation. Relevant persons may have also provided the titleholder with their views of what constitutes reasonable timeframes, their availability and or accessibility issues that should be taken into account. Therefore, what is a reasonable period for consultation should be considered on a case-by-case basis.	**Reasonable period** Beach recognises that what constitutes a reasonable period for consultation should be considered on a case-by-case basis, with reference to the nature, scale and complexity of the activity. EP Sections 4.9 Reasonable Period shows that a reasonable period has been provided and consultation has been completed.
25 Consultation with relevant authorities, persons and organisations, etc. (4) The titleholder must tell each relevant		**Sensitive information**

OPGGS(E)R SECTION *(for consultation)*	**NOPSEMA GUIDELINE**	**HOW REQUIREMENTS WERE MET**
person the titleholder consults that: (a) the relevant person may request that particular information the relevant person provides in the consultation not be published; and (b) information subject to such a request is not to be published under this Part.		EP Section 4.14 Sensitive Information shows that relevant persons have been informed of their rights regarding sensitive information.
24 Other information in environment plan The environment plan must contain the following: (b) a report on all consultations under section 25 of any relevant person by the titleholder, that contains: (i) a summary of each response made by a relevant person; and (ii) an assessment of the merits of any objection or claim about the adverse impact of each activity to which the environment plan relates; and (iii) a statement of the titleholder's response, or proposed response, if any, to each objection or claim; and (iv) a copy of the full text of any response by a relevant person;	**Reporting on consultation in the EP under section 24** The consultation process should be documented within the Environment Plan through the titleholder report on consultation and the sensitive information report. NOPSEMA expects the Environment Plan to also provide descriptions of the consultation processes and the rationale used to determine who and how to consult with relevant persons, including the approach to provision of sufficient information and how a reasonable period for the consultation was determined. This will assist to provide a basis for NOPSEMA to form a reasonable satisfaction view that the titleholder has carried out the consultations required by section 25. The consultation process should also assist the titleholder to meet its obligation under section 280 or 460 of the *Offshore Petroleum and Greenhouse Gas Storage Act* which requires that it must carry out the petroleum or greenhouse gas activity respectively in a manner that does not interfere with navigation, fishing, conservation of resources of the sea and seabed, other offshore electricity infrastructure and petroleum activities, and the enjoyment of native title rights and interests (within the meaning of the *Native Title Act 1993*) to a greater extent than is necessary for the reasonable exercise of the titleholder's rights and obligations. The report on consultation should include clear and precise identification of claims and objections presented, an assessment of the merit of each objection or claim with sufficient rationale provided to support that assessment, and a demonstration of the suitability of any measures adopted as a result of the consultation.	**Report on consultations** EP Section 4.11 Consultation to Minimise Impacts on Relevant Persons Rights shows the approach taken to consult to understand and not interfere with others rights. EP Section 4.15 Report on Consultations Includes responses made, assessment of the merits of objections or claims about the adverse impacts of each activity and Beach's response. The report on consultation is in Appendix A. The full text of any response by a relevant person was provided to NOPSEMA on submission of the EP as sensitive information.
22 Implementation strategy for environment plan (15) The implementation strategy must provide for appropriate consultation with: (a) relevant authorities of the Commonwealth, a State or a Territory; and (b) other relevant interested persons or organisations.	Demonstrating in an Environment Plan that ongoing consultation is a part of a titleholder's implementation strategy as required by section 22(15), is separate to demonstrating that requirements for relevant persons consultation outlined in this guideline have been met	**Ongoing consultation** EP Section 4.16 Consultation for Implementation of EP shows the consultation that will continue as part of the implementation strategy for this EP.

4.5 Principles of Effective Consultation

Beach is committed to genuine, transparent, and meaningful consultation that meets regulatory requirements and applies Beach's own policies and standards. These policies are available on Beach's corporate website:

- Community and Stakeholder Engagement Policy
- Indigenous Participation Policy
- Human Rights Policy
- Community Engagement Standard BSTD 10.2.

This standard incorporates the International Association of Public Participation (IAP2) Spectrum of Public Participation global best practice model.

4.5.1 Consulting Groups with Communal Interests

Beach respects the role of commercial fishing associations in representing their members and consults with them to understand their preferred consultation approach for their executive, board (where applicable) and their members. Where an individual commercial fisher is known to Beach and wishes to receive information from Beach and consult directly, Beach respects such requests.

Beach respects communal interests held by First Nations groups and has approached consultation as set in Section 4.5.2.

4.5.2 Consulting First Nations Groups and Peoples

Beach's Indigenous Participation Policy sets out commitments aimed at building positive, long term, trusting relationships with relevant Indigenous communities. In addition, Beach is cognisant of the NOPSEMA Consultation Guidelines and applicable case law detailed in Sections 4.3 and 4.4 and has applied these requirements in its approach to identifying and consulting with First Nations relevant persons.

As an operator in Victoria, Beach is also cognisant of the Aboriginal Heritage Act 2006 (Vic) (AHA 2006 VIC) that recognises a Registered Aboriginal Party (RAP) as the Traditional Owner Corporation appointed under the AHA 2006 VIC to manage and protect Aboriginal cultural heritage over their Country including coastal and onshore waters. The AHA 2006 VIC recognises RAPs as the primary guardians, keepers and knowledge holders of Aboriginal cultural heritage and the primary source of advice and knowledge on matters relating to Aboriginal places or objects in the appointed RAP region.

Beach's approach to respectful and effective consultation with RAPs and Registered Native Title Body Corporate identified as relevant persons has included the following key steps:

1. Provided information on the activities in this EP (and the OGV Project).
2. Provided information on the purpose of consultation.

3. Explained that the identification of cultural values and sensitivities is an important part of preparing EPs as it enables any impacts and risks to be assessed and where applicable for measures to be developed to reduce impacts and risks to an acceptable level and ALARP.

4. Inquired how they wish to consult with Beach and whether they have existing consultation guidelines and protocols if they wanted consultation between Beach and their members and how they would like that to occur.

5. Asked if there is any information they wish to provide on cultural values and sensitivities and any heritage values and discussed relevant information they have already published where applicable.

6. Inquired if they are aware of any people, who in accordance with Indigenous tradition, may have spiritual and cultural connections to the environment that may be affected by the activity that have not yet been afforded the opportunity to provide information that may inform the management of the activity.

The consultation approach set out above was not to the exclusion of any individual First Nations persons and Beach has undertaken such direct consultations.

Beach carried out desk-top research to identify potential individual First Nations person who may be relevant and placed public notice advertisements in relevant publications to facilitate the opportunity for First Nations peoples, or groups who may not be RAPs or a Registered Native Title Body Corporate, to consult with Beach.

4.6 Relevant Persons Identification methodology

4.6.1 Identification Process

In following the law set out in Santos NA Barossa Pty Ltd v Tipakalippa [2022] FCAFC 193 (appeal decision) Beach undertook a further comprehensive review of its methodology for identifying and consulting with relevant persons resulting in the recently accepted Beach Seabed Survey EP. Beach is constantly refining its methodology cognisant of NOPSEMA Guidelines, recent case law, industry best practice and applicable to the nature and scale of the activities in this EP.

The methodology follows a process of assessing elements of this EP to identify potentially relevant persons: defined activities; the spatial extent of the Operational Areas, Planning Areas and impact and risk specific environment that may be affected (EMBA); environmental values and sensitivities; identification and assessment of risks and impacts. After initial identification, the consultation process was used to verify and refine the initial steps. That process is set out in Figure 4-1.

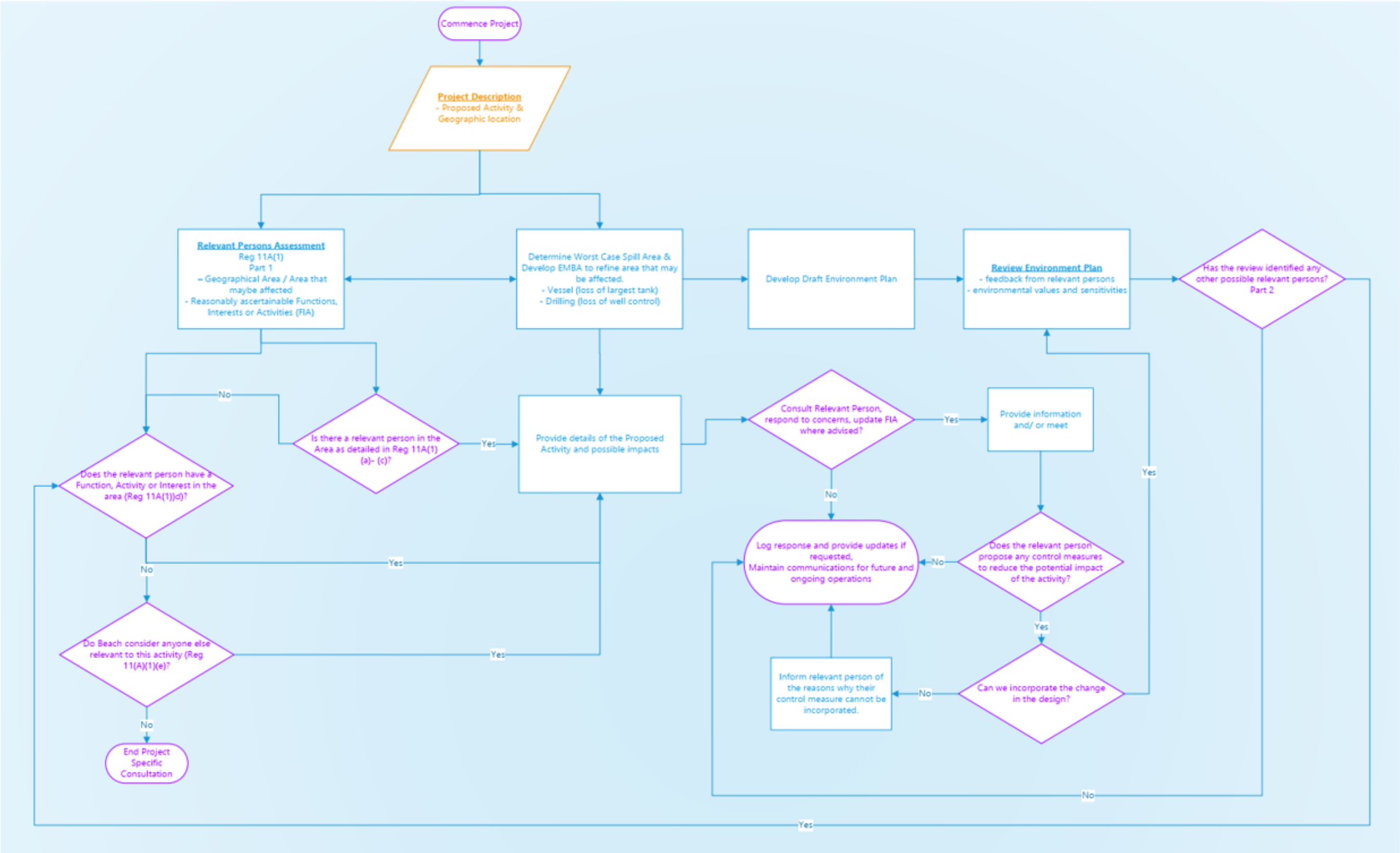


Figure 4-1: Relevant Person Methodology

4.6.2 Geographical Locations

The purpose of consultation is to ensure that authorities, persons, or organisations which are potentially affected by activities are consulted and their input considered in the development of EPs. The proposed activities, their locations and the broadest extent of potential impacts were assessed, after which a geographic area of inquiry was undertaken in the first phase of the relevant person identification methodology.

This process used the following areas:

- Operational Area: where the Drilling Program activities and the rig and vessels will occur.
- Planning Area: the area that may be potentially exposed to hydrocarbons at the low exposure values for the four hydrocarbon phases described in NOPSEMA Environment Bulletin Oil spill modelling (NOPSEMA 2019). The Planning Area is conservatively based on the low exposure values which do not result in environmental or ecological impacts.

The Planning Area was determined from quantitative spill modelling for a loss of diesel from a vessel collision and a loss of containment (condensate) whilst drilling (Section 7.12.4). The spill modelling and impact assessment defines different hydrocarbon exposure values for the four hydrocarbon phases (floating, dissolved, entrained, and accumulated shoreline) that pose different potential ecological and socio-economic risks. Section 7.12.5 details the predicted level of risk.

The defined geographic locations (Figure 6-1) and Section 7 Environmental Impact and Risk Assessment, were examined by the Beach Community Relations and Environment OGV Project team members in the first steps in the relevant persons identification methodology. That assessment was also used to plan appropriate consultation methods given the nature and scale of the activity and the potential impacts on the relevant persons functions, interests, or activities.

There may be instances where potential environmental impacts may occur and despite a geographical overlap, this will not necessarily equate to an impact on a organisations or person's functions, interests or activities, or a potential impact may be immaterial or negligible, and in such instances an organisation or person would not be identified as a relevant person (as defined under OPGGS(E)R Section 25).

Table 4-3 summarises the different geographical areas of inquiry, potential impacts and relevant person category focus for further research to identify relevant organisations or persons.

Table 4-3: Geographic Locations and Relevant Person Focus

Area	Summary of Potential Impacts	Relevant Persons Category Focus
Operational Area Area where the activities will take place.	Displacement of other marine users required to avoid the rig, vessels, and wells. Localised disturbance of the marine environment including seabed, marine fauna, and flora. Potential for disturbance to telecommunications infrastructure.	Relevant Commonwealth and State Departments and Authorities. Persons or organisations whose functions, interests or activities may be affected by the displacement or disturbance from the planned activities, such as: • Commercial fishing • Indigenous groups • Marine based industries • Marine tourism

Area	Summary of Potential Impacts	Relevant Persons Category Focus
		• Environmental conservation groups • Education and research organisations.
Planning Area: Shoreline hydrocarbons Worst-case hydrocarbon releases have been modelled to show the broadest extent of potential shoreline contact at low, moderate and high thresholds.	**Low Threshold** Low threshold shoreline contact hydrocarbons may be visible as a stain or film, thereby reducing visual amenity for tourism and potentially having a socio-economic impact. The low threshold of 10 g/m^2 equates to approximately 2 teaspoons of hydrocarbon per square metre of shoreline accumulation. NOPSEMA and AMSA guidance indicates that the low threshold shoreline hydrocarbon contact would not initiate a clean-up response. **Moderate and high threshold** Moderate and high threshold shoreline hydrocarbon contact has the potential for environmental impact and would require activating the Beach Oil Pollution Emergency Preparedness plan (OPEP). A shoreline concentration of 100 g/m^2 (moderate threshold), or above, is the minimum loading that hydrocarbons can be effectively cleaned up as per the NOPSEMA Oil Spill Modelling Environment Bulletin (April 2019).	Organisations who have responsibilities for emergency response activities, including Commonwealth and State marine pollution agencies. Other organisations who may have supporting or communication role, such as Local Government Authorities or parks management authorities. Persons or organisations whose functions, interests or activities may be affected by unplanned activities such as: • First Nations groups • Marine based industries • Marine tourism • Land tourism • Recreational Associations • Environmental conservation groups.
Planning Area: Floating, entrained and dissolved hydrocarbons. Worst-case hydrocarbon releases have been modelled to determine the broadest extent of potential floating, in-water entrained and dissolved hydrocarbons at low, moderate and high.	**Low threshold** Floating Low threshold floating hydrocarbons would be visible on the sea surface (described as a rainbow sheen) thereby reducing visual amenity for tourism and potentially having a socio-economic impact. The low threshold floating hydrocarbons is considered appropriate for scientific monitoring to assessment potential impacts. In-water entrained and dissolved Low threshold in-water hydrocarbons (dissolved and entrained) are not considered to have environmental, ecological, or socio-economic impacts and are considered appropriate to establish planning area for scientific monitoring. **Moderate and high threshold** Floating Moderate and high threshold floating hydrocarbons may have environmental effects and at the high threshold would require activating the OPEP for a clean-up response. The moderate and high thresholds would trigger scientific monitoring to determine potential impacts to inform management measures such as closure of areas such as fishing grounds. In-water entrained and dissolved Moderate and high threshold entrained and dissolved hydrocarbons may have environmental effects. The moderate and high thresholds would trigger scientific monitoring to determine potential impacts to inform management measures such as closure of areas such as fishing grounds.	Organisations who have responsibilities for emergency response activities, including Commonwealth and State marine pollution agencies. Other organisations who may have supporting or communication role, such as Local Government Authorities or parks management authorities. Persons or organisations whose functions, interests or activities may be affected by unplanned activities such as: • Commercial fishing • Indigenous groups • Marine based industries • Marine tourism • Environmental conservation groups • Education and research organisations.

4.6.3 Defining Relevant Person Categories

The second key step in the relevant persons identification methodology determined the categories of relevant persons whose functions, interests or activities may be affected by the activities in the EP. Defining the categories of relevant persons enabled detailed analysis and research of persons or organisations whose functions, interests or activities may be affected by the planned activities in the operational area, or who may be affected in the event of an unplanned release of hydrocarbons. Relevant persons categories are shown in Table 4-4.

4.6.4 Identifying Relevant Authorities

Relevant authorities, as required in the OPGGS(E)R Section 25(1)(a) and (b) were identified as relevant based on their roles and responsibilities in relation to the proposed activities in this EP, the spatial extent of the Planning Area, potential impacts and control measures. Methods to identify relevant authorities included review of:

- GL1887 – Consultation with Commonwealth agencies with responsibilities in the marine area – January 2024.
- AFMA Petroleum industry consultation with the commercial fishing industry.
- NOPSEMA and Director of National Parks Petroleum activities and Australian Marine Parks. A guidance note to support environmental protection and effective consultation – January 2024
- Beach's recent consultation records in BeachConnect (Beach's stakeholder database).
- Desktop research to identify any agency or department changes.
- Department or Agency feedback to Beach from time to time.

The Department of the responsible State Minister has also been identified, for both Victoria and Tasmania, as required by OPGGS(E)R Section 25(1)(c).

4.6.5 Identifying Relevant Persons or Organisations

Building upon the spatial extent of activities and relevant person category assessments in Table 4-4, the next step involved identifying individual organisations or persons whose functions, interests or activities may be affected by the activities in the EP (OPGGS(E)R Section 25(1)(d)).

Table 4-5 sets out the broad approach for most relevant person categories. Further information is provided in Section 4.6.6 for First Nations and Section 4.6.7 for Commercial Fishers categories.

Table 4-4: Identification of Relevant Persons Categories

Environmental Values and Sensitivities	Operational Area	Planning Area: Floating, dissolved, entrained	Planning Area: Shoreline	Relevant Person Categories
Conservation Values and Sensitivities - Otway				
World Heritage Properties • Tasmanian Wilderness	N/A	N/A	✓ ✓ ✓ ✓ ✓	Relevant Government Departments and Agencies Indigenous Groups Marine Tourism Land Tourism Environment Conservation Groups
Australian Marine Parks: • Apollo • Beagle • Boags • Franklin • Huon • Nelson • Tasman Fracture • Zeehan	N/A	✓ ✓ ✓ ✓ ✓ ✓	N/A	Relevant Government Departments and Agencies Indigenous Groups Marine Based Industries Marine Tourism Educational and Research Organisations Environmental Conservation Groups
National Heritage Places: • Great Ocean Road and Scenic Environs • Point Lonsdale Lighthouse Reserve and Environs • Point Nepean Defence Sites and Quarantine Station Area • Quarantine Station and Surrounds (within Point Nepean Site) • Summerland Peninsula • Tasmanian Wilderness	N/A	N/A	✓ ✓ ✓ ✓ ✓ ✓	Relevant Government Departments and Agencies Indigenous Groups Marine Based Industries Marine Tourism Educational and Research Organisations Environmental Conservation Groups

Environmental Values and Sensitivities	Operational Area	Planning Area: Floating, dissolved, entrained	Planning Area: Shoreline	Relevant Person Categories
• Western Tasmania Aboriginal Cultural Landscape				
Commonwealth Heritage Places: • HMAS Cerberus Marine and Coastal Area • Swan Island and Naval Waters	N/A	N/A	✓ ✓ ✓ ✓	Relevant Government Departments and Agencies Indigenous Groups Land Tourism Environment Conservation Groups
• No wrecks have been recorded within the Otway Operational Areas	N/A	N/A	N/A	N/A
Wetlands of International Importance • Glenelg Estuary and Discovery Bay Wetlands • Lavinia • Port Phillip Bay (Western Shoreline) and Bellarine Peninsula • Western Port	N/A	N/A	✓ ✓ ✓ ✓ ✓	Relevant Government Departments and Agencies Indigenous Groups Land Tourism Educational and Research Organisations Environment Conservation Groups
Nationally Important Wetlands: Numerous on Victoria, Tasmania, and NSW coast. See Section 6.2.7	N/A	N/A	✓ ✓ ✓ ✓ ✓	Relevant Government Departments and Agencies Indigenous Groups Land Tourism Educational and Research Organisations Environment Conservation Groups
Marine Protected Areas: • Victorian – see Section 6.2.8 • Tasmanian – see Section 6.2.10 • SA – See Section 6.2.12 • NSW – See Section 6.2.13	N/A	✓ ✓ ✓ ✓ ✓	Depending on location	Relevant Government Departments and Agencies Indigenous Groups Marine Tourism Educational and Research Organisations Environment Conservation Groups

Environmental Values and Sensitivities	Operational Area	Planning Area: Floating, dissolved, entrained	Planning Area: Shoreline	Relevant Person Categories
Terrestrial Protected Areas: • Victorian – see Section 6.2.9 • Tasmanian – see Section 6.2.11 • NSW – See Section 6.2.14	N/A	N/A	✓ ✓ ✓ ✓ ✓	Relevant Government Departments and Agencies Indigenous Groups Land Tourism Educational and Research Organisations Environment Conservation Groups
Key Ecological Features: • Bonney Coast Upwelling • Seamounts South and East of Tasmania • Upwelling East of Eden • West Tasmania Canyons – only KEF in Operational Area	Only West Tasmania Canyons	✓ ✓ ✓ ✓ ✓	N/A	Relevant Government Departments and Agencies Commercial Fishing Indigenous Groups Educational and Research Organisations Environmental Conservation Groups
Conservation Values and Sensitivities – Bass				
World Heritage Properties • Tasmanian Wilderness	N/A	N/A	✓ ✓ ✓ ✓ ✓	Relevant Government Departments and Agencies Indigenous Groups Marine Tourism Land Tourism Environment Conservation Groups
Australian Marine Parks: • Beagle • Boags • East Gippsland • Flinders • Franklin • Tasman Fracture • Zeehan	N/A	✓ ✓ ✓ ✓ ✓ ✓	N/A	Relevant Government Departments and Agencies Indigenous Groups Marine Based Industries Marine Tourism Educational and Research Organisations Environmental Conservation Groups

Environmental Values and Sensitivities	Operational Area	Planning Area: Floating, dissolved, entrained	Planning Area: Shoreline	Relevant Person Categories
National Heritage Places: • Tasmanian Wilderness • Western Tasmania Aboriginal Cultural Landscape	N/A	N/A	✓ ✓ ✓ ✓ ✓ ✓	Relevant Government Departments and Agencies Indigenous Groups Marine Based Industries Marine Tourism Educational and Research Organisations Environmental Conservation Groups
Commonwealth Heritage Place	N/A	N/A	N/A	N/A
Maritime Archaeological Heritage: detailed in Section 6.2.5 • SS Albert	✓	N/A	N/A	Relevant Government Departments and Agencies
Wetlands of International Importance • Lavinia	N/A	N/A	✓ ✓ ✓ ✓ ✓	Relevant Government Departments and Agencies Indigenous Groups Land Tourism Educational and Research Organisations Environment Conservation Groups
Nationally Important Wetlands: Numerous on Victoria, Tasmania, and NSW coast. See Section 6.2.7	N/A	N/A	✓ ✓ ✓ ✓ ✓	Relevant Government Departments and Agencies Indigenous Groups Land Tourism Educational and Research Organisations Environment Conservation Groups
Marine Protected Areas: • Victorian – see Section 6.2.8 • Tasmanian – see Section 6.2.10 • SA – See Section 6.2.12 • NSW – See Section 6.2.13	N/A	✓ ✓ ✓ ✓	Various assessments, depending on location	Relevant Government Departments and Agencies Indigenous Groups Marine Tourism Educational and Research Organisations

Environmental Values and Sensitivities	Operational Area	Planning Area: Floating, dissolved, entrained	Planning Area: Shoreline	Relevant Person Categories
		✓		Environment Conservation Groups
Terrestrial Protected Areas: • Victorian – see Section 6.2.9 • Tasmanian – see Section 6.2.11 • NSW – See Section 6.2.14	N/A	Various assessments, depending on location	Various assessments, depending on location	Relevant Government Departments and Agencies Indigenous Groups Land Tourism Educational and Research Organisations Environment Conservation Groups
Key Ecological Features: • Big Horseshoe Canyon • Shelf Rocky Reefs • Upwelling East of Eden • West Tasmania Canyons – only KEF in Operational Area	Only West Tasmania Canyons	✓ ✓ ✓ ✓ ✓	N/A	Relevant Government Departments and Agencies Commercial Fishing Indigenous Groups Educational and Research Organisations Environmental Conservation Groups

Environmental Values and Sensitivities	Operational Area	Planning Area: Floating, dissolved, entrained	Planning Area: Shoreline	Relevant Person Categories
Ecological Environment – Otway and Bass				
The ecological and physical environment described in Chapter 6 provides the basis for further assessment of values and sensitivities, along with impact and risk assessments (Chapter 7) from planned and unplanned activities. The ecological and physical environment includes: • Benthic habitats and species assemblages • Soft sediment (habitat for various species) • Seagrass (coastline presence) • Algae (coastline presence) • Coral • Carbonate sands and exposed limestone (habitat for various species) • Basalt rises (habitat for various species) • Mangroves • Plankton • Invertebrates • Fish • Birds • Marine reptiles • Cetaceans • Pinnipeds	✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓	Various assessments specific to ecological feature.	Relevant Government Departments and Agencies Commercial Fishing Indigenous Groups Educational and Research Organisations Environmental Conservation Groups

Environmental Values and Sensitivities	Operational Area	Planning Area: Floating, dissolved, entrained	Planning Area: Shoreline	Relevant Person Categories
Threatened Ecological Communities: detailed in Section 6.4.6.	N/A	✓	Various assessments specific to location of ecological community.	Relevant Government Departments and Agencies Indigenous Groups Educational and Research Organisations Environmental Conservation Groups
Socio-economic – Otway and Bass				
Otway Victoria Local Government Areas: • Bass Coast • Colac Otway • Corangamite • Glenelg • Greater Geelong • Mornington Peninsula • Moyne • Queenscliff • South Gippsland • Surf Coast • Unincorporated Vic • Warrnambool City • Wellington Tasmania: • Circular Head • Flinders • Huon Valley • King Island • West Coast	N/A	✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓ ✓ ✓	Relevant Government Departments and Agencies Community Indigenous Groups Land Tourism Marine Tourism Educational and Research Organisations Environment Conservation Groups

Environmental Values and Sensitivities	Operational Area	Planning Area: Floating, dissolved, entrained	Planning Area: Shoreline	Relevant Person Categories
Bass Victoria Local Government Areas: • Bass Coast • East Gippsland • South Gippsland • Unincorporated Vic • Wellington NSW Local Government Areas: • Bega Valley • Eurobodalla Tasmania: • Circular Head • Flinders • Huon Valley • King Island • West Coast	N/A	✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓ ✓ ✓	Relevant Government Departments and Agencies Community Indigenous Groups Land Tourism Marine Tourism Educational and Research Organisations Environment Conservation Groups
Offshore petroleum industry (non-Beach)	N/A	✓	N/A	Marine Based Industries (offshore oil and gas)
Other infrastructure - Otway Existing: • Victorian Desalination Plant – Planning Area • Indigo Central telecommunications cable – Operational Area Planned in Planning Area: • East Coast Cable System • Hawaiki Submarine Cable • Marinus Link	✓	✓	N/A	Marine Based Industries

Environmental Values and Sensitivities	Operational Area	Planning Area: Floating, dissolved, entrained	Planning Area: Shoreline	Relevant Person Categories
• Sydney-Melbourne-Adelaide-Perth (SMAP) Cable Other infrastructure - Bass Existing in Planning: • Indigo Central telecommunications cable • Bass Strait-1 and Bass Strait-2 telecommunications cable Planned in Planning • East Coast Cable System • Hawaiki Submarine Cable • Marinus Link • Sydney-Melbourne-Adelaide-Perth (SMAP) Cable				
Defence • Restricted Airspace • Unexploded Ordnance Areas	✓	N/A	N/A	Relevant Government Departments and Agencies
Shipping	✓ ✓	✓ ✓	✓ ✓	Relevant Government Departments and Agencies Marine Based Industries
Tourism Recreation (beach walking, fishing, snorkelling, diving, surfing close to coastline)	N/A	✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓ ✓	Relevant Government Departments and Agencies Community Indigenous Groups Land Tourism Marine Tourism Recreational associations

Environmental Values and Sensitivities	Operational Area	Planning Area: Floating, dissolved, entrained	Planning Area: Shoreline	Relevant Person Categories
Commercial fisheries: • Commonwealth • Victoria • Tasmania • SA • NSW	✓	✓	N/A	Commercial Fishing
Seaweed Industry	N/A	✓ ✓	✓ ✓	Business Indigenous Groups
First Nations – Otway and Bass				
Sea Country Native Title Indigenous Groups Protected Areas Indigenous Groups Land Use Agreements	✓	✓	✓	Indigenous Groups
Impacts - Otway and Bass				
Light emissions: may attract light-sensitive species to rig and vessels	✓ ✓ ✓ ✓ ✓	N/A	N/A	Relevant Government Departments and Agencies Commercial Fishing Indigenous Groups Educational and Research Organisations Environmental Conservation Groups
Atmospheric emissions: decrease in air quality, greenhouse gas emissions	✓	N/A	N/A	Relevant Government Departments and Agencies Environmental Conservation Groups
Underwater sound: temporary, during vessel and rig activities, up to 20 km	✓ ✓ ✓	N/A	N/A	Relevant Government Departments and Agencies Commercial Fishing Indigenous Groups

Environmental Values and Sensitivities	Operational Area	Planning Area: Floating, dissolved, entrained	Planning Area: Shoreline	Relevant Person Categories
	✓ ✓ ✓			Educational and Research Organisations Environmental Conservation Groups
Physical presence: • Prelaid anchors: 2 km caution zone for anchors • Rig on location: 500 m PSZ and 2 km caution zone for anchors • Permanent wells: 500 m PSZ	✓ ✓ ✓ ✓	N/A	N/A	Relevant Government Departments and Agencies Commercial Fishing Marine Based Industries Marine Tourism
Seabed disturbance: wells, anchors, drill cuttings	✓ ✓ ✓ ✓ ✓ ✓	N/A	N/A	Relevant Government Departments and Agencies Commercial Fishing Indigenous Groups Marine Based Industries Marine Tourism Environmental Conservation Groups
Marine discharge rig and vessels: putrescible waste, sewerage and grey water, cooling and brine water, bilge water and deck drainage. Marine discharge drilling and P&A: drill cuttings and fluids, P&A fluids, completions fluids, BOP fluids, cement, bulk dry discharges.	✓ ✓ ✓ ✓	N/A	N/A	Relevant Government Departments and Agencies Commercial Fishing Indigenous Groups Environmental Conservation Groups
Risks - Otway and Bass				
Introduction and establishment of invasive marine species	✓ ✓	N/A	N/A	Relevant Government Departments and Agencies Commercial Fishing

Environmental Values and Sensitivities	Operational Area	Planning Area: Floating, dissolved, entrained	Planning Area: Shoreline	Relevant Person Categories
	✓			Indigenous Groups
	✓			Environmental Conservation Groups
	✓			Educational and Research Organisations
Fauna interaction	✓	N/A	N/A	Relevant Government Departments and Agencies
	✓			Indigenous Groups
	✓			Environmental Conservation Groups
	✓			Educational and Research Organisations
	✓			
Loss of waste or materials	✓	N/A	N/A	Commonwealth Departments / Agencies
	✓			Commercial Fishing
	✓			Indigenous Groups
	✓			Environmental Conservation Organisations
	✓			
Loss of containment – diesel and condensate	✓	✓	✓	Relevant Government Departments and Agencies
	✓	✓	✓	Community
	✓	✓	✓	Commercial Fishing
	✓	✓	✓	Indigenous Groups
	✓	✓	✓	Land Tourism
	✓	✓	✓	Marine Tourism
	✓	✓	✓	Educational and Research Organisations
	✓	✓	✓	Environment Conservation Groups
Spill response activities	✓	✓	✓	Relevant Government Departments and Agencies
	✓	✓	✓	Commercial Fishing
	✓	✓	✓	Land Tourism

Environmental Values and Sensitivities	Operational Area	Planning Area: Floating, dissolved, entrained	Planning Area: Shoreline	Relevant Person Categories
	✓	✓	✓	Marine Based Industries
	✓	✓	✓	Marine Tourism
	✓	✓	✓	Environment Conservation Groups

Table 4-5: Relevant Persons Research Methods

Activity	Detail
Database Review	Beach's stakeholder database (BeachConnect) contains a significant number of organisations and individuals identified since 2014 for consultation in the development of EPs. A comprehensive review was undertaken in November 2022 for further consultation on the Thylacine Installation and Commissioning EP. Another review was undertaken during January and February 2023 for the Otway Offshore Operations EP review. In preparing for consultation on the OGV Project, a further review of BeachConnect was undertaken. Specific activities have included: • Merged Otway and Bass basin offshore project relevant persons lists to create a consolidated master list for OGV Project. • Reviewed master list of organisations and individuals against relevant person categories identified in assessment of totality of environment values, sensitivities, impacts and risks. • Contacted each organisation or individual where engagements showed no or few responses or where data appeared out of date, verified contact details and if they wished to continue consulting with Beach.
Functions, interests or activities	Identification of potential new relevant persons involved preliminary research into their functions, interests and activities from: • Readily ascertainable information on internet search engines, social media channels and organisation websites. • Prior communication with persons and organisations is reviewed to update the records of functions, interests and activities captured against entity records in BeachConnect. • Beach prepares information sheets that explain the purpose of consultation, the meaning of 'relevant person' in accordance with the regulations (among other things) and invites the reader to advise any other people whom they believe may be a relevant person to contact Beach. • Beach creates ongoing opportunities for relevant persons to participate in consultation through public notice advertisements in local newspapers and radio stations; attending local Beach information sessions. • Through the consultation process, relevant persons functions, interests or activities are updated in BeachConnect when new information is available.
Local knowledge	• Beach's Group Manager Social Performance and Community Relations has carried out wide ranging consultations for offshore and onshore Otway Basin projects since 2014, has extensive knowledge of local community, commercial fishing industry and other relevant persons, and has personally reviewed the relevant persons identifications methodology and consultation plan for this EP. • Beach has previously contracted consultants who live in south-west Victoria and have extensive local knowledge of organisations and persons who may be relevant persons, to undertake research into potentially relevant persons based on the categories identified. • Beach has increased the Victorian Community Engagement function from two persons to four persons to carry out local consultation.
Broad based keyword search	• Searched online for potentially relevant persons using key words including boat; swim; dive; sail; yacht; fish; marine environment; oceans; marine mammals; cultural heritage; maritime heritage. • Combined above terms with place-based search terms of: Warrnambool; Peterborough; Port Campbell; Apollo Bay; Portland; Mount Gambier; Port MacDonnell; Beachport; Robe; Burnie; Flinders Island; Devonport; Stanley; Strahan; King Island; Lakes Entrance; Eden; Bermagui; and Bega. • Investigated and monitored media articles and online campaigns around offshore activity concerns and using the above searches. • Investigated social media channels including LinkedIn, Facebook, and Instagram in the above searches.
Marine Spatial Planning Framework	• Reviewed the submissions to the Marine Spatial Planning Framework being developed in response to the Victorian *Marine and Coastal Act 2018* to identify additional potentially relevant persons.

Activity	Detail
	• Contacted organisations to inquire if they wish to be consulted.
Warrnambool Moyne Shire, and Glenelg Shire Focus	• Beach has an extensive list of relevant persons in Port Campbell, Peterborough, and Timboon with whom engagement has been undertaken for many years. • Whereas relevant persons in Warrnambool, Port Fairy and Portland have historically only involved commercial fishers. • For each relevant person newly identified in Warrnambool and broader Moyne Shire, Beach inquired if they could recommend other relevant persons and this approach successfully identified several additional relevant persons. • Drop-in sessions in Warrnambool, Port Fairy and Portland were added to the schedule.
Bass Coast Shire, South Gippsland Shire, Wellington Shire and East Gippsland Shire etc	• Reviewed existing database contacts. • Identified and contacted relevant Local Government Authorities. • Online search and identification of any commercial fishing and marine tourism businesses in accordance with the Planning Area and assessment criteria identified in our methodology, time to exposure, extent of exposure, volumes ashore and probability of accumulation above threshold. • Public notice ads were advertised in the South Gippsland Sentinel Times and The Advertiser (Bairnsdale).
King Island Focus	• Engagement approach was developed with King Island Council. • Types of organisations engaged include: industry and tourism associations; marine based tourism businesses; coast care groups; fishing industry; and seaweed industry. • King Island Council and King Island Chamber of Commerce also provided additional suggested relevant persons, that Beach contacted.
North-west/west Tasmania focus	• Reviewed existing database contacts. • Identified and contacted relevant Local Government Authorities. • Online search and identification of any commercial fishing and marine tourism businesses in Devonport, Stanley and Strahan in accordance with the Planning Area and assessment criteria identified in our methodology; time to exposure, extent of exposure, volumes ashore and probability of accumulation above threshold.
Sapphire Coast (NSW) focus	• Online search and identification of any commercial fishing and marine tourism business in Eden, Bega and Bermagui in accordance with the Planning Area and assessment criteria identified in our methodology; time to exposure, extent of exposure, volumes ashore and probability of accumulation above threshold. • Ensured inclusion of entities responsible for emergency spill response and commercial fishing sector
Marine Parks	• Contacted Parks Victoria to clarify agency and divisional responsibilities and updated Beach's database with information on the separate teams dedicated to marine parks and sanctuaries in the 12 Apostles and Apollo Bay areas. • Contacted NSW National Parks & Wildlife Service, Department of Primary Industries NSW (Marine Parks), and Department of Natural Resources and Environment Tasmania (Parks and Wildlife Services). • Engaged with the Director of National Parks as per the NOPSEMA and Director of National Parks guidance note. Shape files were provided as part of the required 'sufficient information'. • Reviewed database of parties licensed to carry out activities within marine parks.
Conservation Groups	• Based on desktop research of media coverage and organisations, identified further regional and national conservation groups, sought direct engagement, and commenced consultations with organisations who responded. • Given the nature and scale of the activities in this EP, Beach's methodology was evolved to include both regional and national groups focussing on those with a direct interest in the Otway and Bass basin offshore Oil and Gas industry, groups whose interests are potentially most affected such as marine conservation, and where such consultation could contribute further information that would meet the purpose of consultation to identify concerns and implement mitigations.

Activity	Detail
	• National ENGOs were included where a specific interest or campaign on gas development within Victorian, Tasmanian or Commonwealth waters could be identified.
Tourism Groups	• Researched marine tourism operators active between Portland and Apollo Bay, South and East Gippsland, West Tasmanian Coast, NSW Sapphire Coast and King Island. Identified additional relevant persons offering services such as boat charters, SCUBA diving; equipment hire; sea kayaking. • For locations where shoreline oil is limited to the low threshold, the following is considered for relevant persons identification associated with tourism (i.e. NSW Sapphire Coast and Gippsland?): time to exposure, extent of exposure, volumes ashore and probability of accumulation above threshold. • Shore based tourism focus is where there may be moderate to high shoreline contact in the event of an emergency and adjacent to our Operational Areas.
Local Government	• Contacted local government councils adjacent to operational areas to review the correct personnel to liaise with for Beach activity updates and environmental questions or concerns.

4.6.6 Identifying First Nations Groups or Persons

Beach has assets in Victoria that have been in operation for many years. Since becoming operator of those assets, Beach has been investing time to build honest and transparent relationships with the First Nations groups on whose traditional lands and waters Beach operates. Beach has consulted with these groups for various purposes including relationship building, agreement making, cultural heritage management plans and community development initiatives. These engagements have been led by Beach's Manager First Nations Engagement, a First Nations person who also has completed post graduate studies in land and sea country management and cultural heritage.

Beach understands that Sea Country is an important part of First Nations people's traditional estate, and they hold a cultural responsibility to ensure its protection and management. First Nations people's relationship to their sea country brings with it a complexity of cultural rights and responsibilities, including the right to access, use and distribute resources, and the responsibility to manage those resources from generation to generation. First Nations groups are owners of their country, they belong to their country, they identify with their country, and they are stewards of their country, including their sea country (Smyth 1994).

First Nations groups who reside along the coasts or on islands believe that Sea Country contains the evidence of creation stories, stories about animals, plants, and people, as well as the creation of landscape features such as islands and reefs. Coastal and Islander communities held cultural responsibilities to ensure sea country is cared for and sea country was managed very carefully. Contemporary First Nations groups including Registered Aboriginal Parties and Native Title Body Corporates are playing an increasingly important role in the management of this Sea Country, through formalised roles and programs with that work alongside various State and Commonwealth government departments or agencies.

Values and sensitivities regarding Sea Country may include different features such as:

- Historic and contemporary cultural harvesting of marine flora and fauna.
- Cultural landscape features that hold dreamtime and creation stories, such as offshore islands, Estuaries, beaches, bays, and marine areas.
- Different marine and avian species that hold deep connections to cultural lore and represent spiritual emblems.

Given these Sea Country values and sensitivities, there is the potential for some First Nations groups and peoples to be considered 'Relevant Persons' in relation to the proposed activities set out in this EP. Beach understands the interconnectedness of Sea Country, along with the importance of respectful and effective consultation with Registered Aboriginal Parties and Registered Native Title Body Corporates. Given this knowledge, Beach's method of identifying potential First Nations Peoples that may be Relevant Persons included:

- Assessed the total values and sensitivities of the physical environment that may be affected by the planned and unplanned activities in the EP, including the spatial extent of the activities.

- Carried out desktop research to identify any published Sea Country, Healthy Country research or Management plans that may identify any culturally significant landscapes, totem species, marine and avian, that may be considered a cultural value or sensitivity relevant to the activities.
- Beach continues to recognise the importance of sea country and researched opportunities to uplift our knowledge of sea country and submerged cultural heritage and to connect further and develop relationships with First Nations groups and leading regulatory bodies, scholars and marine archaeologists.
    - National Sea Country Summit November 2023 in Darwin.
    - Underwater Cultural Heritage Conference 13th – 15th September 2023 in Canberra.
- Understanding and respecting that First Nations Peoples are protective of their cultural sensitivities, and therefore such information may not be published, further research was undertaken to identify First Nations Peoples organisations and persons including:
    - Using the National Native Title database to identify any Native title claims or determinations in the area adjacent to our activities.
    - Using the Victorian Aboriginal Heritage Council online map to identify and Recognised Aboriginal parties in Victoria.
    - Researched the Prescribed Bodies Corporate, Registered Aboriginal Parties, Native Title holders and claimants. This research focussed on Victoria and northern Tasmania given the nature and scale of the planned and unplanned Activities, including the spatial extent of the planning area in the EP.
    - Consulted with First Nations Peoples Legal Research Service to seek their advice on identifying First Nations Relevant Persons.
    - Consulted with First Peoples State relations to seek their advice on our relevant person methodology and identify any additional community groups or individual who may be considered relevant.
    - Consulted with Melbourne Local Aboriginal Networks to identify any individuals not aligned with the Prescribed Body Corporates to self-identify.
    - Consulted with Department of Premier and Cabinet Tasmania to identify any additional First Nations corporations, individuals, or groups.
    - Consulted with Tasmanian Aboriginal Heritage Council to identify any additional First Nations groups/individuals or corporations that may be relevant.
    - Consulted with local Council authorities on King Island to identify additional First Nations residents who may be considered a relevant person.
    - Consulted with NSW Department of Aboriginal Affairs to identify relevant First Nations groups.

- Researched Native title bodies, Heritage representatives and land councils in New South Wales.
- Visit the local government authority websites (the shire or municipal council) who often include an acknowledgement of the local traditional owners.
- Review of Commonwealth, State Marine Park Management Plans, or Indigenous Protected Areas (IPAs) that overlap the planning area which may identify Traditional Custodians or representative bodies to contact regarding Seas Country and any cultural values.
- Asked each First Nations group or person consulted if they could identify any other potentially Relevant Persons (organisations or people) who may wish to be consulted, alternatively if they did not want to identify them to us, we requested they share our project information to them.
- Advertised in the Koori Mail and National Indigenous Times newspapers to invite consultation with any persons who may have a function, interest or activity that may be affected by the activities set out in the EP. This additional step was undertaken to provide an opportunity for any person's unknowable to Beach, notwithstanding the relevant person identification steps undertaken.
- Completed a broad-based online keyword search using: Deakin University Library; Google; Google Scholar; LinkedIn; Facebook; TikTok; and Instagram to identify potential additional relevant persons or organisations using the following search terms:
    - Searched terms relating to potential cultural values and sensitivities including Sea Country; Saltwater Country; cultural sea country; cultural sea values; cultural values; totems; Sea Country Totems; submerged cultural heritage and landscapes; paleo landscapes; songlines; whales; whale songlines; dream time; deep time; dreaming.
    - Combined above terms with indigenous terms: First Nations; Aboriginal; Indigenous; Aboriginal newsletters; Aboriginal news.
    - Combined above terms with industry related terms: gas; offshore gas; fossil fuels; offshore energy.
    - Combined above terms with place-based search terms of: New South Wales, Yuin people, South Coast, Victoria; Tasmania; Warrnambool; Peterborough; Port Campbell; Port Fairy; Flinders Island, and King Island.
- Investigated and monitored media articles identified in the above searches for further relevant persons.
- Investigated LinkedIn pages for connections associated with identified First nations groups.

The land and sea country adjacent to the Otway Basin Drilling and P&A Operational Area and most of the Planning Area is the traditional lands of the Eastern Maar peoples. The Eastern Maar Aboriginal Corporation (EMAC) manages native title rights for the Eastern Maar Peoples. EMAC is a Recognised Native Title Body Corporation and holds native title rights for the sea and landscape features that hold

dreamtime and creation stories, such as offshore islands and different marine and avian species that hold deep connections to lore and represent spiritual emblems.

The land and sea country north of the Bass Operational Area and Planning Area, is the Bunurong Land Council Aboriginal Corporation. Bunurong are the Registered Aboriginal Party whom under the Victorian Aboriginal Heritage Act (2006) are recognised as the primary guardians, keepers and knowledge holders of Aboriginal Cultural Heritage and are the primary source of advice and knowledge on matters relating to Aboriginal places or Aboriginal objects within their registered region.

Beach have also identified other First Nations groups who may have an interest in the Drilling Program based on a worst-case scenario of an incident in the Planning Areas. They include:

- Wadawurrung Traditional Owners Corporation
- Gunditj Mirring Traditional Owners Aboriginal Corporation
- Gunaikurnai Land and Waters Aboriginal Corporation
- Aboriginal Land Council Tasmania
- Tasmanian Aboriginal Centre
- Flinders Island Aboriginal Association Inc
- Circular Head Aboriginal Corporation.
- Yuin Nation which is represented by the following local Aboriginal land councils:
    - Eden
    - Bega
    - Merrimans
    - Wagonga
    - Bodalla

Beach Energy's First Nations Engagement Manager has undertaken extensive research and engagement with Victorian and Tasmanian State Government agencies and other First Nations groups to identify potentially relevant persons. Beach's methodology for identifying First Nations groups has been endorsed by First Peoples State Relations Victoria and Aboriginal Heritage Council Victoria.

4.6.7 Identifying Commercial Fishers

The commercial fishing sector is a primary category of relevant person due to the potential displacement impacts of the activities in this EP. Beach has an extensive commercial fisher database and long-term positive relationships with peak commercial fishing associations and many individual fishers. Notwithstanding these existing relationships, given the spatial extent of the activities in this EP

and the full scope of the proposed OGV Project activities, Beach has undertaken a comprehensive review of its commercial fisher relevant persons. Steps have included:

- Identified and mapped designated State and Commonwealth fishery areas that may operate in the Operational and Planning areas.
- Reviewed Australian Fisheries Management Authority website to verify relevant fishery associations and contact details.
- Reviewed State based fishery authorities for any relevant fishery associations and contact details.
- Reviewed BeachConnect database to verify relevant fishery associations, pertaining to the types of fisheries that may operate in the Operational and Planning areas.
- Requested fishing data from VFA, Fishing Tasmania (formerly DPIPWE) and AFMA to verify fishing effort within designated fisheries in the operational area, in order to seek consultation with relevant fishing associations and commercial fishers.
- Commissioned South East Trawl Fishing Association (SETFIA) who represent Commonwealth South East Trawl Sector; Scalefish Hook Sector; Shark Hook, Shark Gillnet Sectors; small pelagic fishery to draft a comprehensive fishing assessment across both state and commonwealth waters. Reviewed report for any new fishing sectors identified. Report confirmed Beach stakeholder database is current. The SETFIA Commercial Fishing Data report is included in Appendix B.
- Engaged Seafood Industry Victoria (SIV) who represent all State licenced commercial fishers to contact their members to share Beach's OGV Project and Drilling and P&A information sheets to members and inquire if they have any questions or concerns about the activities based on their fishing operations. Formalised service agreement with SIV regarding consultation with SIV leadership and members.
- Engaged SETFIA to request their support in contacting their members, share Beach's OGV Project and Drilling and P&A information sheets, and inquire if they have any questions or concerns about the activities based on their fishing operations.
- Engaged Tuna Australia to contact their members to share Beach's OGV Project and Drilling and P&A information sheets to members and inquire if they have any questions or concerns about the activities based on their fishing operations. Formalised service agreement with Tuna Australia regarding consultation with Tuna Australia leadership and members.
- Reviewed Fisheries Research and Development Corporation website for potentially relevant persons.
- Contacted South Australian Department of Primary Industries and Regions – Commercial Fishing for assistance with identifying relevant commercial fishers.
- Contacted NSW Department of Primary Industries – Fisheries for assistance with identifying relevant commercial fishers.

4.7 Relevant Persons Identified

4.7.1 List of Relevant Authorities – 25(1)(a), (b), (c)

Organisation Name	Roles and Responsibilities
1a Department or Agency of the Commonwealth	
Australian Fisheries Management Authority	The Australian Fisheries Management Authority (AFMA) is responsible for the implementation of Commonwealth fisheries policy. In managing Commonwealth fisheries, AFMA pursues objectives as outlined in the Fisheries Management Act 1991, Fisheries Administration Act 1991 and Torres Strait Fisheries Act 1984. In managing Consultation with Commonwealth agencies Guideline National Offshore Petroleum Safety and Environmental Management Authority N-04750-GL1887 A705589 20/01/2023 Page 14 of 19 Commonwealth fisheries, AFMA applies the principles of ecologically sustainable development and complies with the relevant sections of the EPBC Act. AFMA manages Commonwealth fisheries in consultation with the fishing industry and other user groups, such as those that represent traditional fishing, recreational fishing and the environmental non-government organisations. These management processes are used to implement controls, such as limits on catch or effort levels, and regulations of fishing methods in order to manage Australia's fisheries in a sustainable way. AFMA ensures that any broad-scale impacts of offshore petroleum industry development on commercial fishing in Commonwealth waters are considered in decision making by the Department of Industry, Science and Resources. AFMA provides comment on the annual offshore petroleum exploration acreage release prior to their release (this information is made available to operators as part of the release area notices).
Australian Maritime Safety Authority - Joint Rescue Coordination Centre	The Australian Maritime Safety Authority (AMSA) is a statutory authority, and its principal functions are to: • promote maritime safety and protection of the marine environment. • prevent and combating ship-sourced pollution in the marine environment. • provide infrastructure to support safe navigation in Australian waters. • provide a national search and rescue service to the maritime and aviation sectors. AMSA delivers a range of navigational services, primarily aimed at the levy-paying commercial shipping industry. These services provide ships with the ability to navigate safely around Australia's coastline and to and from its ports. AMSA also implements and enforces a range of legislation relevant to the Commonwealth marine area which gives effect to Australia's obligations under various international treaties and conventions
Department of Agriculture, Fisheries and Forestry – Fisheries, Biosecurity and Marine Pests	The Department of Agriculture, Fisheries and Forestry (DAFF) has primary policy responsibility for promoting the biological, economic and social sustainability of Australian fisheries. DAFF provides policy advice to the Australian Government on a range of economic and environmental fisheries issues, including the conservation of marine ecosystems and biodiversity that support commercially valuable fisheries resources.

Organisation Name	Roles and Responsibilities
	DAFF has primary policy and regulatory responsibility for managing marine pest biosecurity through administering the Biosecurity Act. DAFF's principal functions with respect to marine pest biosecurity are to: • reduce the likelihood of the entry and establishment of exotic marine pests; • provide national leadership in the response to new marine pest incursions and in the management of established marine pests, in cooperation with state and territory governments, and with industry stakeholders; • represent Australia's interests in the establishment of international guidelines and conventions relating to marine pests.
Department of Climate Change, Energy, the Environment and Water -Oceans	The Department of Climate Change, Energy, the Environment and Water (DCCEEW) administers the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), the Underwater Cultural Heritage Act 2018 and the Environment Protection (Sea Dumping) Act 1981 all of which have some application in the Commonwealth marine area.
Department of Defence - Australian Hydrographic Office	Department of Defence agency responsible for the publication and distribution of nautical charts and other information require for the safety of ships navigating in Australian waters. The AHO issues fortnightly Notices to Mariners for relevant nautical products.
Department of Defence - Infrastructure Division, Defence Support & Reform Group	Manages the development, maintenance and disposal of the Defence estate, including unexploded ordinance (UXO).
Department of Industry, Science and Resources	Responsibilities include offshore oil and gas development and safety, and greenhouse gas storage.
Director of National Parks	The Director of National Parks (DNP) is the statutory authority responsible for administration, management and control of Australian marine parks (AMPs). Under the EPBC Act and subordinate regulations, a range of activities undertaken in an AMP requires approval from the DNP. Petroleum and greenhouse gas activities undertaken in an AMP are assessed by NOPSEMA in accordance with the NOPSEMA EPBC Act Program. Additional assessment by the DNP is therefore not necessary as the NOPSEMA EPBC Act Program considers impacts on marine reserve values. The DNP has authorised offshore petroleum and greenhouse gas exploration activities to occur in certain marine park zones (ICUN VI) by issuing class approvals. The class approvals require that titleholders have an accepted EP and operate in accordance with the EP for the allowable activities accepted by NOPSEMA. Additional assessment by the DNP is not necessary if the activity is authorised by a class approval. For details about the locations of AMPs and the class approvals see: parksaustralia.gov.au/marine. NOPSEMA has published guidance in consultation with the DNP and Parks Australia that outlines key considerations during the preparation of EP submissions for activities that are within or have the potential to impact on the values of an AMP.
Indigenous Land and Sea Corporation	Statutory authority providing assistance for acquiring and managing rights and interests in land, salt water and freshwater country.

Organisation Name	Roles and Responsibilities
National Native Title Tribunal	Commonwealth government authority responsible for administering the native Title Act 1993 (Cth) across multiple functions including reviews, meditations and determinations for: Native title applications, and Indigenous land use agreements (ILUAs)
1b Department or Agency of a State	
Aboriginal Heritage Tasmania	Aboriginal Heritage Tasmania aims to protect and promote Tasmania's unique Aboriginal heritage and facilitate the return of land to Tasmania's Aboriginal people. Aboriginal Heritage Tasmania administers the *Aboriginal Heritage Act 1975*, which establishes the Aboriginal Heritage Council of Tasmania, the *Aboriginal Lands Act 1995*, which establishes the Aboriginal Land Council of Tasmania, and the *Native Title (Tasmania) Act 1994*.
Corangamite Catchment Management Authority	Responsibilities include the protection of estuaries on the southern coast Princetown and Anglesea.
Department of Energy, Environment and Climate Action - Marine &Coasts	Protecting and enhancing our coastline and its waters to support business, tourism, recreation, wellbeing and biodiversity.
Department of Energy, Environment and Climate Action: EarthResources Regulation	Regulatory body for oil and gas activities in Victorian waters. Required to be notified of reportable incidents. Commencement and cessation notifications are only required for drilling and seismic surveys.
Department of Infrastructure and Transport - Marine Safety SA	Department taking care of boat and marine safety in South Australian Ocean and inland waters.
Department of Natural Resources and Environment Tasmania -Biosecurity	Working to prevent pests and diseases that could cause serious impacts if introduced to Tasmanian waters.
Department of Natural Resources and Environment Tasmania -Conservation	The Conservation Assessment Team provide advice and comment to a range of key regulators and stakeholders on development activities that have the potential to impact on natural values.
Department of Natural Resources and Environment Tasmania -Marine/Fisheries (Fishing Tasmania)	Responsible for commercial and recreational fishing and the protection of the ocean and marine life and Fishing Tasmania.
Department of Natural Resources and Environment Tasmania -Strategic Projects and Policy	Responsible for policy.
Department of Natural Resources and Environment Tasmania -Tasmania Parks and Wildlife Services	Responsible for managing the State's marine reserves and Tasmanian Wilderness World Heritage site.

Organisation Name	Roles and Responsibilities
Department of Premier and Cabinet - Office of Aboriginal Affairs -(Tasmania)	Tasmanian Aboriginal people of Lutruwita/Tasmania have had a deep connection to Country for over 40,000 years. We acknowledge with respect the deep history of Aboriginal peoples continuous connection to Country, Waterways, Sea and Sky Country. With respect we acknowledge and honour Elders, past and present and their knowledges that have been handed down through the generations. We acknowledge Tasmanian Aboriginal people that share cultural knowledges and practices keeping culture and heritage alive. The Office of Aboriginal Affairs is one part of the new Aboriginal Affairs Partnership Division, which sits in the Division of Communities, Partnerships and Priorities within the Department of Premier and Cabinet. The Office of Aboriginal Affairs is the touch point, providing high-level consultation with Tasmania's Aboriginal people, organisations, and adviser to the Government on policy issues and impacts affecting Aboriginal people of Tasmania. The Office of Aboriginal Affairs team is a dedicated group of people that support and respect the aspirations and goals of Tasmanian Aboriginal people. The team works with Aboriginal people, organisations, and government to better understand and to deliver their policies and programs effectively in an Aboriginal way. The Government is committed to improving the lives of Aboriginal people through the National Agreement on Closing the Gap the Tasmanian Implementation Plan and the Truth-Telling and Treaty further resetting the relationship further with the Tasmanian Aboriginal people. The role of Office of Aboriginal Affairs is to foster exchange between Aboriginal people and the Government of Tasmania to advise the Minister for Aboriginal Affairs and Cabinet on issues impacting Aboriginal people. In partnership with Aboriginal community-controlled organisations and Aboriginal people lead whole of Government and cross-sectoral change to achieve real outcomes for Aboriginal people in Tasmania.
Department of Primary Industries and Regions South Australia -Commercial Fishing	Responsible for protecting aquatic environments, licensing and registration of fisheries and fish processors, fisheries management plans, scientific research and innovation and increasing trade and investment in conjunction with industry.
Department of Transport and Planning: Marine Pollution	Ensures Victoria is adequately prepared for and effectively responds to a marine pollution incident in State coastal waters up to three nautical miles (3 nm) offshore.
Environment Protection Authority (EPA) - South Australia	Protects, restores, and enhances the environment through risk-based regulation of pollution, waste, noise and radiation.
Environment Protection Authority (EPA) Tasmania	Control Agency for a Level 1 / 2 / 3 Pollution emergency in Tasmanian waters.
Environment Protection Authority (EPA) Victoria	Independent statutory authority responsible for regulating Victorian Environment Protection legislation. Focussed on onshore activities, not offshore.

Organisation Name	Roles and Responsibilities
First Peoples - State Relations (Victoria)	Group within the Department of Premier and Cabinet, responsible for nation-leading work in the areas of cultural rights, self- determination, treaty, and truth – an extensive program of priority work with First Peoples. Stated purpose is "Strengthening and engaging communities and managing and protecting cultural heritage".
Heritage Victoria	Protection of maritime heritage / shipwrecks/submerged cultural heritage
Marine and Safety Tasmania	Marine and Safety Tasmania (MAST) is a statutory authority responsible for the safe operation of vessels, provide and manage marine facilities and manage environmental issues relating to vessels.
NSW Department of Primary Industries – Commercial Fishing NSW Advisory Council	Responsible for viability of NSW commercial fishing industry.
NSW Department of Primary Industries – Marine Parks	Statutory Authority responsible for management of Marine Protected Areas, Marine National Parks, Marine Sanctuaries, Marine and Coastal Parks, Marine Parks, and Marine Reserves.
NSW National Parks & Wildlife Service	Statutory Authority responsible for 895 protected areas in NSW.
Office of the Minister for Environment	Advises the Victorian Cabinet on matters relating to environment protection.
Parks Victoria	Statutory Authority responsible for management of Marine Protected Areas, Marine National Parks, Marine Sanctuaries, Marine and Coastal Parks, Marine Parks and Marine Reserves.
Port Authority NSW	Port Authority of New South Wales (Port Authority) manages the navigation, security and operational safety needs of commercial shipping in New South Wales
Transport for NSW	Responsible for emergency response in NSW coastal waters
Transport Safety Victoria - Maritime Safety Victoria	Management of marine safety in Victoria. Relevant in relation to fishers entering PSZ.
Victorian Fisheries Authority	Independent statutory authority established to effectively manage Victoria's fisheries resources.
1c Department of the Responsible State Minister	
Department of Energy, Environment and Climate Action	Regulatory body for oil and gas activities in Victorian waters. Required to be notified of reportable incidents. Commencement and cessation notifications are only required for drilling and seismic surveys.
Department of State Growth - Mineral Resources Tasmania	Regulatory body for oil and gas activities in Tasmania waters. Required to be notified of reportable incidents. Commencement and cessation notifications are only required for drilling and seismic surveys.

4.7.2 List of Relevant Persons – 25(1)(d)

Organisation Name	Type	Functions, Interests or Activities
Name withheld	Commercial Fishing	Commercial fisher.
Atlantis Fisheries Consulting Group	Commercial Fishing	Consulting services to encourage and promote sustainable fishing practices to the commercial fishing industry within Australia.
Australian Southern Bluefin Tuna Industry Association	Commercial Fishing	Peak body representing Southern Bluefin Tuna companies in Australia. The SBTF overlaps the operational area.
Australian Wildcatch Fishing (Corporate Alliance Enterprises)	Commercial Fishing	SESS Fisher.
Bass Strait Scallop Industry Association	Commercial Fishing	No information can be found in relation to the Bass Strait Scallop Industry Association other than it is referenced in the Bass Strait Central Zone Scallop Fishery Management Arrangements Booklet 2019.
Bermagui Fishermen's Co-op	Commercial Fishing	Commercial fisher south-east NSW.
Commonwealth Fisheries Association	Commercial Fishing	Peak incorporated association representing associations for the following Commonwealth fisheries that have catch effort within the Planning Area: SESS (Commonwealth South East Trawl Sector, Scalefish Hook Sector and the Shark Hook and Shark Gillnet Sectors). Southern Squid Jig Fishery.
Coorong Wild Seafood	Commercial Fishing	Fisher and processor based in Port MacDonnell that fishes in local waters for Southern Rock Lobster, Ocean Jacket, Southern Bluefin Tuna, Bight Redfish, Flathead, Boarfish, John Latchet, Knifejaw and Yellowtail Kingfish. Also operates Coorong Wildside Tours.
Ferguson Australia	Commercial Fishing	Fisher and processor based in Port MacDonnell that fishes in local waters for Southern Rock Lobster, Ocean Jacket, Southern Bluefin Tuna, Bight Redfish, Flathead, Boarfish, John Dory, Latchet, Knifejaw and Yellowtail Kingfish.
Fisheries Direct Pty Ltd	Commercial Fishing	Fisheries management consulting services as well as fresh local seafood from Port Welshpool and Tasmania.
Fishwell Consulting	Commercial Fishing	Research advice and consulting services to encourage and promote sustainable fishing practices to the commercial fishing industry within Australia. General interest in Beach activities and service provider to Beach.
Hursey Seafoods	Commercial Fishing	Tasmania commercial fisher – wholesale and restaurant.
King Island Seafoods	Commercial Fishing	Wholesale lobster seller.
Lakes Entrance Fishermen's Co-operative	Commercial Fishing	Lakes Entrance is situated in the most strategic position of the very large South East trawl area of Australia, which stretches from the Victorian/South Australia border around to the Northern New South Wales and includes Tasmania.

Organisation Name	Type	Functions, Interests or Activities
Name withheld	Commercial Fishing	Fishing charter fishing in Portland and Port Phillip Bay.
MacTaggart Marine	Commercial Fishing	Lobster fisher based in Apollo Bay.
Muollo Fishing	Commercial Fishing	SESS Fisher.
Mures Fishing	Commercial Fishing	SESS Fisher.
Petuna Sealord Deepwater Fishing Pty Ltd	Commercial Fishing	SESS Fisher.
RHG Fisheries	Commercial Fishing	SESS Fisher.
Richey Fishing Company	Commercial Fishing	Commercial scallop, salmon and squid fisher and marine charter service.
Scallop Fishermen's Association of Tasmania Inc	Commercial Fishing	The Scallop Fishermen's Association of Tasmania actively promotes and protects the best interests of scallop fishermen and processors and negotiates management and season arrangements with the Tasmanian government, DPIPWE and AFMA.
Seafood Industry Australia	Commercial Fishing	The national peak-body representing members from the wildcatch, aquaculture and post-harvest sectors of the Australian seafood industry.
South East Trawl Fishing Industry Association	Commercial Fishing	Incorporated association representing commercial fishers in: Commonwealth South East Trawl Sector; Scalefish Hook Sector; Shark Hook, Shark Gillnet Sectors; small pelagic fishery.
Southern Fishermen's Association Inc.	Commercial Fishing	Represents the interests of Lakes and Coorong commercial fishers and is pro-active in promoting improved environmental management practices in the fishery across a number of areas.
Southern Shark Industry Alliance (SSIA)	Commercial Fishing	Incorporated association with members from the Southern and Eastern Scalefish and Shark Fishery, Gillnet Hook and Trap.
Strait off the Boat	Commercial Fishing	Commercial fisher in Bass Strait out of Devonport.
Sustainable Shark Fishing Association	Commercial Fishing	Represents fishers in the Southern and Eastern Scalefish and Shark Fishery (SESS), Gillnet Hook and Trap fisheries.
Tasmania Salmonid Growers Association	Commercial Fishing	Tasmania’s peak body representing salmon growers.
Tasmanian Abalone Council Ltd	Commercial Fishing	Peak industry body representing divers, processors and quota holders.
Tasmanian Rock Lobster Fisherman's Association	Commercial Fishing	Peak body representing licenced Tasmanian rock lobster fishers.
Tasmanian Seafood Industry Council	Commercial Fishing	Peak body representing the interests of wild capture fishers, marine farmers and seafood processors in Tasmania.
Tasmanian Seafoods	Commercial Fishing	Fishes for wild abalone, sea cucumber and other seafoods from around the whole of Tasmania, the south coast of Victoria and Western Australia.

Organisation Name	Type	Functions, Interests or Activities
Top Fish Tasmania	Commercial Fishing	Tasmania's only state licenced octopus business, fishing in CWLTH and TAS waters. Also, fish lobster and giant crab. Have processing facility in Stanley for value adding to octopus for packaged products. Family run business.
Tassal	Commercial Fishing	Salmon fisher with presence in Strahan, West Tasmania.
Toberfish	Commercial Fishing	Portland based Southern & Eastern Scalefish and Shark fisher.
Top Fish Tasmania	Commercial Fishing	Tasmania's only state licenced octopus business, fishing in CWLTH and TAS waters. Also, fish lobster and giant crab. Have processing facility in Stanley for value adding to octopus for packaged products. Family run business.
Tuna Australia	Commercial Fishing	Represents statutory fishing rights for owners, holders, fish processors and sellers, and is an associate member of the Eastern and Western tuna and billfish fisheries.
Name withheld	Commercial Fishing	Commercial fisher.
Name withheld	Commercial Fishing	Commercial octopus fisher
Name withheld	Commercial Fishing	Warrnambool based lobster fisher.
Name withheld	Commercial Fishing	Rock lobster fisher based in Portland.
Name withheld	Commercial Fishing	Southern Squid fisher.
Name withheld	Commercial Fishing	Rock lobster fisher active in the Portland area.
Name withheld	Commercial Fishing	Shark and seine fisher based in San Remo.
Name withheld	Commercial Fishing	Port Fairy cray fisher who sells directly to the public. Co-owns 'Off the Boat', selling direct to the public.
Name withheld	Commercial Fishing	Lobster fisher based in Apollo Bay
Name withheld	Commercial Fishing	Rock lobster fisher based in Warrnambool.
Paaratte Eel Company	Commercial Fishing	Eel fisher licensed to operate in the Curdies River, Curdies Inlet and Gellibrand River.
Name withheld	Commercial Fishing	Lobster fisher based in Port Fairy.
Name withheld	Commercial Fishing	Abalone and shark fisher off Portland.
Port Campbell Lobster	Commercial Fishing	Southern Victorian lobster fisher who sells direct to the public.
Port Campbell Professional Fisherman's Association	Commercial Fishing	Representing primarily lobster fishers in Port Campbell and Peterborough. Engage via SIV.
Name withheld	Commercial Fishing	Lobster fisher based in Portland.
Name withheld	Commercial Fishing	Port Fairy home port. Fishes Rock Lobster in Apollo Bay region. Fishes shark long line in Western Zone.

Organisation Name	Type	Functions, Interests or Activities
Name withheld	Commercial Fishing	Rock lobster fisherman and member of Apollo Bay Fisherman's Co-Op.
San Remo Fishing Co-operative	Commercial Fishing	Philip island and Bass Strait fishing co-op
Seafood Industry Victoria	Commercial Fishing	Peak body representing professional fishing, seafood processors and exporters in Victoria. SIV primary contact for State fishers. Prefers to and can engage all licence holders rather than direct contact by Beach.
South Australian Rock Lobster Advisory Council and South Eastern Professional Fishermen's Association	Commercial Fishing	Promotes the South Australian Rock Lobster Industry, with strong links to the South Eastern Professional Fishermen's Association Inc in the Southern Zone Fishery and also the SA Northern Zone Rock Lobster Fishermen's Association Inc in the Northern Zone Fishery. SARLAC is a major stakeholder in Southern Rock Lobster Limited; the national industry body across all of Southern Australia encompassing the relevant fisheries in South Australia, Tasmania, and Victoria.
South Coast Fish Processors	Commercial Fishing	Commercial fisher south-east NSW
South Coast Mariculture	Commercial Fishing	Developing marine leases in Eden.
Southern Rock Lobster Limited	Commercial Fishing	Administers an industry wide levy that funds research, development, and innovation in Australia's Southern rock lobster fishery, underpinning the sustainable harvest of lobsters from the Southern Ocean.
Name withheld	Commercial Fishing	Declared that they fish in the area.
Name withheld	Commercial Fishing	Lobster fisher based in Portland.
Trinsand Fisheries	Commercial Fishing	Squid jig fishing, scallop fishing (in Bass Strait)
Victorian Scallop Fishermen's Association	Commercial Fishing	Represents the interests of scallop fishers operating within the Bass Strait Central Zone Scallop Fishery, the Victorian Scallop Fishery, and the Tasmanian Scallop Fishery.
Warrnambool Professional Fishermen's Association	Commercial Fishing	Members mainly fish for Rock Lobster between Port Fairy and Port Campbell.
Name withheld	Commercial Fishing	Fishes around the Thylacine platform. Commercial Rock Lobster and crab fisher.
Wild Life Fisheries	Commercial Fishing	Based in Rye, Mornington Peninsula. Dive and fish in Port Phillip Bay and Bass Strait. Sea urchin, abalone and line caught fish.
Women in Seafood Australasia	Commercial Fishing	Women in Seafood Australasia (WISA) is the only national organisation representing women working in the seafood industry.
Name withheld	Commercial Fishing	Based in Port MacDonnell. Fishes lobster in Victorian waters from Portland to Cape Otway. Fishes giant crab near King Island.
Aboriginal Land Council of Tasmania	Indigenous	The statutory body established under Tasmanian law to own and manage land on behalf of Tasmania's Aboriginal Community.

Organisation Name	Type	Functions, Interests or Activities
Bega Local Aboriginal Land Council	Indigenous	NSW Aboriginal Land Council
Bodalla Local Aboriginal Land Council	Indigenous	NSW Aboriginal Land Council
Boon Wurrung Foundation	Indigenous	Represents the traditional people and custodians of the lands from the Werribee River to Wilson Promontory, proud members of the Kulin People – the Boonwurrung and Woi wurrung, Dja dja warrung, Wadawurrung, Taungurung (not coast).
Bunurong Land Council Aboriginal Corporation	Indigenous	Registered Aboriginal Party for an on behalf of the Bunurong People, with lands and waters across greater Melbourne, Mornington Peninsula, and the Bass Coast.
Burrandies Aboriginal Corporation	Indigenous	Burrandies Aboriginal Corporation has been serving the Indigenous Community of the South East of South Australia since 1999. Having a strong connection with local community members and a team that is committed to ensuring that every Indigenous person has the opportunity to reach their potential to participate in the workforce with dignity and pride.
Circular Head Aboriginal Corporation	Indigenous	CHAC is governed by the Corporations Aboriginal and Torres Strait Islander (CATSI) Act. As a registered Aboriginal organisation, CHAC is regulated by the Office of the Registrar of Indigenous Corporations (ORIC) as per the CATSI Act.
Eastern Maar Aboriginal Corporation	Indigenous	Registered Aboriginal Party. Native Title Holders along with Gunditj Mirring Traditional Owners Aboriginal Corporation. Eastern Maar Traditional Owner Settlement Agreement claim area includes Sea Country adjacent the project Planning area. Interests include the protection of Sea Country. However formal Sea Country management activities, alongside government agencies do not currently exist in the Planning Area.
Eden Local Aboriginal Land Council	Indigenous	NSW Aboriginal Land Council
First Nations Legal & Research Services Ltd	Indigenous	Native Title Service Provider for Victorian Traditional Owners.
First Peoples Assembly of Victoria	Indigenous	Independent and democratically elected body to represent Traditional Owners and Aboriginal and Torres Strait Islanders in Victoria.
Flinders Island Aboriginal Association Inc	Indigenous	An Aboriginal Community Controlled Organisation. Established in 1971 by a local Aboriginal group, FIAAI is governed by an Aboriginal Board of Management, elected by the local community.
Gunaikurnai Land and Waters Aboriginal Corporation	Indigenous	Recognition and settlement agreement under the Traditional Owner Settlement Act Victoria that does not require recognition or extinguishment of native title under the Native Title Act 1993 (Cth) but provides for the State's recognition of a group of people as the traditional owners for a particular area together with other benefits.
Gunditj Mirring Traditional Owners Aboriginal Corporation	Indigenous	Registered Aboriginal Party. Native Title Holders with Eastern Maar Aboriginal Corporation.
Land and Sea Aboriginal Corporation Tasmania	Indigenous	Land and Sea Aboriginal Corporation Tasmania

Organisation Name	Type	Functions, Interests or Activities
Melythina Tiakana Warrana Aboriginal Corporation	Indigenous	MTWAC is a registered Aboriginal organisation with the Office of the Registrar of Indigenous Corporations (ORIC), under the Corporations (Aboriginal and Torres Strait Islander) Act 2006 (CATSI Act).
Merrimans Local Aboriginal Land Council	Indigenous	NSW Aboriginal Land Council
NSW Aboriginal Land Council	Indigenous	NSW Aboriginal Land Council
Tasmanian Aboriginal Centre	Indigenous	Represents the political and community development aspirations of the Tasmanian Aboriginal community.
Wadawurrung Traditional Owners Aboriginal Corporation	Indigenous	Registered Aboriginal Party for Wadawurrung country ranging from Aireys Inlet to Werribee South.
Wagonga Local Aboriginal Council	Indigenous	NSW Aboriginal Land Council
Name withheld	Indigenous	A Gunditjmara woman, who is part of the Southern Ocean Protection Embassy Collective, led by Gunditjmara Elders and Mob in Protection of The Southern Ocean and Gunditjmara Sea Country.
Aventus Consulting	Business	Aventus specialises in providing environmental, safety and well integrity approvals and advice, auditing to the upstream petroleum and broader energy industry, covering all onshore and offshore activities.
Coastal Planning	Business	Specialises in VCAT appeals, development applications, subdivision applications, strategic planning, panel hearing submissions and general statutory planning advice. Services the Great Ocean Road and Otways.
ConocoPhillips	Business	Oil and Gas industry in offshore Otway Basin.
Cooper Energy	Business	Oil and Gas industry in offshore Otway Basin.
Esso	Business	Oil and Gas industry in offshore Bass Basin.
Schlumberger Australia Pty Ltd	Business	Seismic survey operations, may occur in Otway Basin
TGS (previously Spectrum Geo)	Business	Seismic survey operations, may occur in Otway Basin
Apollo Bay Chamber of Commerce	Business	Partners with local businesses to do better business and promote the local area through events and promotion.
King Island Chamber of Commerce	Business	Supporting local businesses, with the ability to share information to members.
King Island Regional Development Organisation	Business	Supports the development of lifestyle, employment, tourism, and events on King Island.
Savour King Island	Business	Organises the Festival of King Island.
Seamaster Fishing Supplies	Business	Business supplying commercial fishing equipment in Devonport, Tasmania.
Port Campbell Progress Association	Business	Volunteer group with a focus on local business, sustainable development, and new initiatives.

Organisation Name	Type	Functions, Interests or Activities
Twelve Apostles Tourism and Business Group	Business	A membership-based organisation that provides leadership for the development and facilitation of local tourism and business initiatives.
Watersure, Victorian Desalination Plant	Business	Operator of desalination plant providing quality drinking water to the Victorian community.
Apollo Bay Landcare	Environmental Conservation Groups	The group has a strong focus on local environmental issues such as monitoring the nests of the endangered Hooded Plover.
Australian Coastal Society - Victorian Chapter	Environmental Conservation Groups	Contributes to a number of coastal and marine policy reforms happening in Victoria via working groups and submissions.
Australian Conservation Alliance	Environmental Conservation Groups	The Australian Conservation Alliance (ACA) is an organisation comprised of young professionals who advocate for and advance ambitious market-based climate law and policy.
Australian Conservation Foundation	Environmental Conservation Groups	The ACF brings people together to have the biggest possible impact for nature and climate solutions. Advocate against drilling and fracking for gas that could destroy sacred sites.
Australian Marine Conservation Society	Environmental Conservation Groups	Scientists working with research centres around the globe and conservation experts safeguarding the future of Australian oceans.
Beach Patrol 3280	Environmental Conservation Groups	A volunteer organisation keeping Warrnambool's beaches clean of washed-up plastic and rubbish.
Beyond Gas Network	Environmental Conservation Groups	The Beyond Gas Network is a volunteer network of grassroots climate action network. Focus on educating community about the scale and impact of expansion plans proposed by the gas industry to encourage lobbying of state and federal government.
Environment Tasmania	Environmental Conservation Groups	Work with communities on campaigns and initiatives to protect Tasmania's natural environment.
Environment Victoria	Environmental Conservation Groups	Independent charity funded by donations. A community of 40 grassroots member groups and over 200,000 supporters. Campaigning to solve the climate crisis and build a thriving, sustainable society that protects and values nature.
Fight for the Bight	Environmental Conservation Groups	Goal is to protect the Great Australian Bight from exploitation by Big Oil
Friends of Bay of Islands Coastal Park	Environmental Conservation Groups	A community group preserving native vegetation, revegetating, and removal of exotic invasive species.
Friends of the Earth - Melbourne Chapter	Environmental Conservation Groups	Currently running a "No more gas" campaign.
Greenpeace	Environmental Conservation Groups	Have a "Breaking free from fossil fuels" campaign.

Organisation Name	Type	Functions, Interests or Activities
International Fund for Animal Welfare	Environmental Conservation Groups	Global non-profit helping animals and people thrive together. Run various programs including marine mammal rescue and research, and marine conservation.
King Island Landcare	Environmental Conservation Groups	Delivers a wide range of environmental/agricultural projects.
Marine Mammal Foundation	Environmental Conservation Groups	Aims to protect the marine environment - for mammals like Southern Right Whales - through research, community engagement, and education. Supported by the Australian Government.
OceanWatch Australia	Environmental Conservation Groups	OceanWatch Australia is a national not-for-profit environmental company that works to advance sustainability in the Australian seafood industry.
Otway Climate Emergency Action Network (OCEAN)	Environmental Conservation Groups	Community group against seismic testing and gas exploration in the Otway Basin.
Port Campbell Community Group	Environmental Conservation Groups	Volunteer group focussed on environment protection of local fauna.
Protect the West	Environmental Conservation Groups	Interested in SW Vic environment issues.
Surfers For Climate	Environmental Conservation Groups	A sea-roots movement dedicated to positive climate action and heads the campaign 'Don't Drill the Otways'.
Surfrider Foundation Australia	Environmental Conservation Groups	Not-for-profit dedicated to the protection of Australia's waves and beaches through conservation, activism, research, and education.
Victorian National Parks Association	Environmental Conservation Groups	VNPA is an independent, non-profit, membership-based group that protects Victoria's unique natural environment and biodiversity through the establishment and effective management of national parks, conservation reserves and other measures. Includes marine parks.
Warrnambool Coastcare Landcare Network	Environmental Conservation Groups	Improving biodiversity in Warrnambool and district and an advocate for the protection of the natural environment.
Wilderness Society Tasmania	Environmental Conservation Groups	Interest in environmental impacts. Against any gas development.
Wilderness Society Victoria	Environmental Conservation Groups	Interest in environmental impacts of activities.
Apollo Bay Police and Ocean Rescue	State Government	Apollo Bay Police activates the ocean rescue volunteer group.
MLC, Member for Western Victoria	State Government	Member of the Victorian Parliament, Legislative Council. Electorate includes South West Victoria.
Bass Coast Shire Council	Local Authorities	Local government area located in the south eastern part of the Victoria.

Organisation Name	Type	Functions, Interests or Activities
Bega Valley Shire Council	Local Authorities	Local government area located in south-east NSW (Sapphire Coast).
Burnie City Council	Local Authorities	Local government area in the north-west of Tasmania.
Cardinia Shire Council	Local Authorities	Local government area in the south-east of Melbourne between Western Port and the Yarra Ranges.
Circular Head Council	Local Authorities	A rural local government body in Tasmania covering the far north-west mainland. Major towns and localities include Arthur River, Marrawah and Stanley, with Smithton being the largest and principal town.
City of Port Phillip	Local Authorities	Local government area on the northern shores of Port Phillip.
Colac Otway Shire Council	Local Authorities	Local government area in the Barwon South West region of Victoria. Opposed to seismic testing for oil and gas in the Otway Basin.
Corangamite Shire Council	Local Authorities	Local government area in the Barwon South West region of Victoria.
District Council of Grant	Local Authorities	Local government area in the Limestone Coast region of South Australia,
East Gippsland Catchment Management Authority	Local Authorities	The Authority is one of ten Catchment Management Authorities throughout Victoria established under the Catchment and Land Protection Act 1994 and the Water Act 1988.
East Gippsland Shire Council	Local Authorities	Local government area in Gippsland, Victoria.
Eurobodalla Shire Council	Local Authorities	Local government area located in south-east NSW (Sapphire Coast).
Flinders Council	Local Authorities	Flinders Council includes the communities within the Furneaux Group and the islands of eastern Bass Strait up to the Victorian border, including the Hogans Group and the Deal Island Group.
Gippsland Ports	Local Authorities	Gippsland Ports' designated waters stretch over 720 kms from Anderson Inlet to Mallacoota on the south-eastern coastline of Victoria at: Mallacoota Inlet, Snowy River (Marlo), Gippsland Corner Inlet and Port Albert, Anderson Inlet (Inverloch) and four waterways: Lake Tyers, Shallow Inlet, Tamboon Inlet and Sydenham Inlet.
Glenelg Hopkins Catchment Management Authority	Local Authorities	The Authority managing inland waterways, as well as the health of estuaries in the region– analysing water levels and quality, and weather conditions for potential closures and re-openings.
Glenelg Shire Council	Local Authorities	Local government area including the towns of Casterton, Heywood, Merino, and Portland.
Great Ocean Road Coast and Parks Authority	Local Authorities	Delivers better protection and management of the iconic coast and parks of Victoria's Great Ocean Road.
Greater Geelong Council	Local Authorities	Local government area in the Barwon South West region of Victoria.
Huon Valley Council	Local Authorities	Local government area in south-west Tasmania.
King Island Council	Local Authorities	Local government body in Tasmania, encompassing King Island.

Organisation Name	Type	Functions, Interests or Activities
Mornington Peninsula Shire Council	Local Authorities	Local government area in south eastern Metropolitan Melbourne, Victoria.
Moyne Shire Council	Local Authorities	Local government area in the Barwon South West region of Victoria.
Otway Water	Local Authorities	Strong interest in groundwater extraction.
Robe District Council	Local Authorities	Local government area located in the Limestone Coast area of South Australia.
South Gippsland Shire Council	Local Authorities	Local government area in Gippsland.
Surf Coast Shire Council	Local Authorities	Local government area in the Barwon South West region of Victoria. Opposed to oil and gas development in the Otway Basin.
Waratah Wynyard Council	Local Authorities	Waratah-Wynyard north- west Tasmania, includes the coastal towns and villages of Wynyard, Somerset, Boat Harbour and Sisters Beach, the rural town of Yolla and the former mining towns of Waratah and Corinna
Warrnambool City Council	Local Authorities	Services to residential and business rate payers to provide infrastructure and services for economic development, safety, and amenity.
Wattle Range Council	Local Authorities	Local government area located in the Limestone Coast area of South Australia.
Wellington Shire Council	Local Authorities	Local government area in eastern Victoria.
West Coast Council	Local Authorities	Local government area in western Tasmania.
West Gippsland Catchment Authority	Local Authorities	Manage land and water resources in the West Gippsland region
AusOcean	Education and Research Organisations	Australian Ocean Lab (AusOcean) mission is to help our oceans through technology. Develop and apply open-source ocean technology to help solve ocean science and conservation challenges.
Blue Whale Study Inc	Education and Research Organisations	Primary research into the ecology of endangered blue whales in south-east Australia.
Deakin University - School of Life and Environmental Sciences	Education and Research Organisations	Research interests in various environment values and sensitivities and support for further research programs with common interests.
King Island Marine Research	Education and Research Organisations	Lobster breeding - research and development.
Dolphin Research Institute	Education and Research Organisations	DRI's research is focused primarily on the south-eastern region of Victoria, especially Port Phillip, Western Port, and the Gippsland Lakes.
Fisheries Research and Development Corporation	Education and Research Organisations	A co-funded partnership between the Australian Government and the fishing and aquaculture sectors, to plan and invest in fisheries research, development, and extension activities in Australia.

Organisation Name	Type	Functions, Interests or Activities
Institute for Marine and Antarctic Studies, University of Tasmania	Education and Research Organisations	A collaborative research body in marine and Antarctic science between the University of Tasmania, CSIRO Marine and Atmospheric Research, the Australian Antarctic Division and other agencies. Research interests in various environment values and sensitivities and support for further research programs with common interests.
Basslink	Marine Based Industries	Subsea cable in Bass Strait within the Bass Operational Area.
Bass Strait Freight	Marine Based Industries	Bass Strait Freight is a shipping company based in Bridport, a small coastal town, on the North-East Coast of Tasmania. Bridport's close proximity to Flinders Island make it ideally suited to provide regular services to the Furneaux Group of Islands, including Flinders Island, Cape Barren Island and 'as required services' to King Island and Port Welshpool (Victoria).
Bass Strait Transport	Marine Based Industries	Operate a comprehensive freight consolidation and transport service between Mainland Australia and Tasmania daily, specialising in general, time-sensitive, hazardous, and out of gauge/oversize freight
BW Digital	Marine Based Industries	Subsea cable in Bass Strait, Hawaiki Nui Project outside of the Operational Areas.
CRE Solutions	Marine Based Industries	Specialising in Trans-Bass (Bass Strait) movements from/to mainland Australia and Tasmania.
Currie Cargoes	Marine Based Industries	Cargo shipping between King Island and Melbourne and King Island and Devonport.
Eastern Line Shipping	Marine Based Industries	Ship cattle to and from King Island and also ship freight from Stanley plus out of Welshpool in Victoria.
Freight Connections	Marine Based Industries	Tasmanian cargo services.
Fresh Freight Tasmania	Marine Based Industries	Operate a door-to-door freight forwarding between Tasmania and Mainland Australia, 7 days a week.
Indigo Subsea Cable Consortium	Marine Based Industries	Subsea cable consortium in Bass Strait near Yolla pipeline.
Kelp Industries Pty Ltd	Marine Based Industries	Source bull kelp from the shores of King Island and process it at their mill. Most product shipped to Norway where alginates are extracted.
Kina Commercial Diving	Marine Based Industries	Kina Diving specialises in commercial and scientific diving and marine services which include underwater inspection and construction, ship surveys and repair, fishery and environmental surveys, instrument deployment and recovery, project design and management, salvage services and vessel charter.
King Island Shipping Group	Marine Based Industries	A new group of community, industry and government representatives who have an interest in improving King Island's shipping and freight services.
Marinus Link	Marine Based Industries	Marinus Link is a proposed 1500-megawatt capacity undersea and underground electricity connection to further link Tasmania and Victoria as part of Australia's future electricity grid. The cable is located outside of the Operational Areas.
Optus	Marine Based Industries	Telecommunications
Port Anthony	Marine Based Industries	Shipping facility located east of Melbourne in Corner Inlet.

Organisation Name	Type	Functions, Interests or Activities
Port of Port Fairy	Marine Based Industries	Operated and managed by Moyne Shire Council, the port is used by commercial fishing enterprises and recreational boaters and anglers. Situated on the Moyne River in Port Fairy.
Port of Portland	Marine Based Industries	Strategically located on the south-west coast between Melbourne and Adelaide, the Port of Portland is Victoria's only naturally deep-water port, providing a logistics gateway to the rest of Australia and the world, with connectivity to national and rail networks.
Qube Ports	Marine Based Industries	Impact on shipping
SeaRoad Holdings Pty Ltd	Marine Based Industries	Sea freight services. Operate in Bass Strait.
Spirit of Tasmania	Marine Based Industries	Sails from the Port of Melbourne to Devonport. The ferry crosses Port Phillip Bay and Bass Strait and they travel at both day and night.
Star of the South	Marine Based Industries	Offshore Wind developer in Bass Strait.
TasKelp	Marine Based Industries	Source bull kelp from the shores of King Island and the West Coast of Tasmania and process it at their mill. Product shipped to Scotland where alginates are extracted.
Tasports	Marine Based Industries	Takes care of Tasmania's passenger, cargo, and community ports. Also runs Bass Island Line; a dedicated shipping service for the King Island community offering a weekly direct service from Devonport.
Toll Group	Marine Based Industries	The Toll Group is an Australian transportation and logistics company with operations in road, rail, sea, air, and warehousing. Their sea routes go through Bass Strait region. Toll Shipping transport goods from Melbourne to Tasmania, straight through our permit areas for Prion, also Trefoil Drilling and P&A area.
SUBCO	Marine Based Industries	Potential future subsea cable (SMAP) in Bass Strait near Yolla Pipeline. Proposed onshore entry at Torquay.
Superloop	Marine Based Industries	Interest in subsea Indigo Central communications fibre cable that connects Singapore to Perth to Sydney and is within the Otway Operational Area.
Telstra	Marine Based Industries	Telstra Corporation Limited is an Australian telecommunications company which builds and operates telecommunications
MP, Federal Member for Braddon	Commonwealth Government	Member of the Australian Parliament, House of Representatives. Electorate includes King Island.
MP, Federal Member for Wannon	Commonwealth Government	Member of the Australian Parliament, House of Representative. Electorate includes South West Victoria.
Name withheld	Community	Commented on OGV project and is against any gas development
Name withheld	Community	Commented on OGV supporting the requirement for more gas East Coast of Australia.

Organisation Name	Type	Functions, Interests or Activities
French Island Community Group	Community	French Island is an unincorporated territory with no local government. Instead, the community manages its own affairs as well as some public facilities.
Name withheld	Community	Interest in local environmental issues
Name withheld	Community	Commented on OGV at Portland community drop-in. Has broad environmental concerns
Lang Lang Gas Plant Environment Liaison Group	Community	Activities associated with the Lang Lang Gas Plant. Half yearly (6 months) meetings with the group. Basis for determination of relevant persons: Activity or impact to Lang Lang Gas Plant. Beach may send information on offshore activities to individual members if requested.
Lang Lang District Business and Community Group	Community	Work collectively to enable opportunities that enrich the lives of our diverse community.
Name withheld	Community	Commented on OGV requesting information on methods of engagement. Is not local and there is no impact.
Name withheld	Community	Commented on OGV at community drop-in session. Interested in whale migration
Port Fairy Boardriders	Community	A social surfing group that also works on local environmental projects.
Timboon Action Group	Community	Volunteer group committed to the promotion and development of the town and community.
Name withheld	Community	Lobster fisher.
Name withheld	Community	Commented on past EPs and Beach has continued to engage.
12 Apostles Helicopters & Port Campbell Heliport	Tourism/Recreation	Port Campbell based tourism operator that offers helicopter flights over the 12 Apostles area.
Apollo Bay Dive Centre and Surf n Fish	Tourism/Recreation	Ocean based activities for locals and visitors.
Apollo Bay Fishing Charters	Tourism/Recreation	Ocean based activities for locals and visitors.
Apollo Bay Fishing Tours	Tourism/Recreation	Ocean based activities for locals and visitors.
Apollo Bay Surf & Kayak	Tourism/Recreation	Ocean based activities for locals and visitors.
Apollo Bay Visitor Information Centre	Tourism/Recreation	Providing information for tourists to the region.
Australian Recreational Fishing Foundation	Tourism/Recreation	The Australian Recreational Fishing Foundation is the peak representative body to the Australian Federal Government.
Dive Industry Association of Australia	Tourism/Recreation	Encourages the exchange of ideas and information on diving- related issues; to seek solutions to matters of common concern, and to offer practical advice and support to its constituent membership.
Far Out Fishing Charters	Tourism/Recreation	Far Out operates Off-Shore Fishing Charters in Lakes Entrance. Off-shore fishing for Gummy Shark, Snapper, Mako Sharks or Flathead.
Game Fishing Association of Australia	Tourism/Recreation	Peak body for recreational game fishers.

Organisation Name	Type	Functions, Interests or Activities
Game Fishing Association of Victoria	Tourism/Recreation	Peak body for recreational game fishers.
Great Ocean Road Regional Tourism	Tourism/Recreation	Independent peak body for tourism operators along the Great Ocean Road and Surf Coast.
King Island Boat Club	Tourism/Recreation	Based at Grassy Harbour, and the finish to the annual Queenscliff to Grassy Yacht Race.
King Island Tourism/Visitor Information Centre	Tourism/Recreation	Providing information for tourists to the region.
Mersey Yacht Club	Tourism/Recreation	Yacht club based in Devonport TAS. Hosts Ocean racing events Melbourne to TAS.
Ocean Racing Club of Victoria	Tourism/Recreation	Various ocean racing events from Brighton.
Outthere Outdoor Activities	Tourism/Recreation	Sea Kayaking and snorkelling.
Pioneer Kayaking	Tourism/Recreation	Sea kayaking – Churchill Island Marine Park
Port Campbell Visitor Information Centre	Tourism/Recreation	Providing information for tourists to the region.
Port Fairy Yacht Club	Tourism/Recreation	The Club conducts yacht racing offshore from Port Fairy and Portland in the Southern Ocean and Bass Strait, including hosting the Ocean Racing Victoria " Queenscliff to Port Fairy. Club members also compete in the Melbourne Hobart and Melbourne King Island races and are involved in the Clean Oceans initiative and therefore have an interest in the area.
Port Fairy Angling Club	Tourism/Recreation	Recreational angling club for Port Fairy.
Portland SCUBA	Tourism/Recreation	Offers open water diving courses around Portland.
Portland Sport Fishing Club	Tourism/Recreation	Mainly fish on the open ocean near Portland but also fish the Victorian championships in Gippsland.
Portland Yacht Club	Tourism/Recreation	Members sail inside the harbour as well as access ocean sailing in and around Portland Bay.
Recreational Fishing Alliance of NSW	Tourism/Recreation	Peak body representative for NSW recreational fishers.
Royal Yacht Club of Tasmania	Tourism/Recreation	Yacht club involved in local (Hobart / river) and ocean sailing activities and events.
SCUBA Divers Federation of Victoria	Tourism/Recreation	Peak body representing over 25 amateur dive clubs reaching 2500 members.
South Gippsland Yacht Club	Tourism/Recreation	Recreational activity.
Southern Coast Charters	Tourism/Recreation	Marine tourism activity.
Surfcoast Anglers	Tourism/Recreation	A Facebook page dedicated to recreational anglers on Victoria's surf coast and beyond.
TARFish	Tourism/Recreation	Tasmania recreational fishing peak body. Able to communicate on our behalf to all licenced recreational fishers.
Timboon Recreational Fishing Club	Tourism/Recreation	Regional recreational fishing club accessing the Port Campbell jetty boat launch facility.

Organisation Name	Type	Functions, Interests or Activities
VR Fish	Tourism/Recreation	Victorian recreational fishing peak body. Able to communicate to all licenced recreational fishers.
Warrnambool Offshore & Light Game Fishing Club	Tourism/Recreation	Recreational fishing in Otway offshore waters.
Warrnambool Visitor Information Centre	Tourism/Recreation	Providing information for tourists to the region.
Warrnambool Yacht Club	Tourism/Recreation	Only operates in Lady Bay, no ocean racing.
MP, Tasmanian Member for North West, West Coast and King Island	State Departments/Agencies	Member of the Tasmanian Parliament, House of Assembly and Minister for Resources. Electorate includes King Island.
MLC, Member for Western Victoria	State Departments/Agencies	Member of the Victorian Parliament, Legislative Council. Electorate includes South West Victoria.
Office of the Member for Northern Victoria Region	State Departments/Agencies	Member of the Victorian Parliament, Legislative Council.
Office of the Member for Polwarth	State Departments/Agencies	Member of the Victorian Parliament, Legislative Assembly. Electorate includes the Otways and Great Ocean Road.
Office of the Member for South West Coast	State Departments/Agencies	Office of the Member of the Victorian Parliament, Legislative Assembly. Electorate spans from Portland to Warrnambool.
Office of the Member for Western Victoria	State Departments/Agencies	Member of the Victorian Parliament Legislative Council. Electorate includes South West Victoria.
State Member for Western Victoria Region	State Departments/Agencies	Upper House Member of the Victorian Parliament.
State Member for Western Victoria Region	State Departments/Agencies	Upper House Member of the Victorian Parliament.
Victorian Marine and Coastal Council	State Departments/Agencies	The state's peak advisory body providing independent advice on marine and coastal issues to the Minister for Energy, Environment and Climate Change.
MP State Member for Port Adelaide	State Departments/Agencies	Deputy Premier and Minister for Climate, Environment and Water
Coastlife	Marine Tourism	Ocean based activities on Sapphire Coast.
Fishbermi	Marine Tourism	Tourist cruise boat out of Bermagui
Game On Charters	Marine Tourism	Portland based fishing charter targeting Bluefin tuna, gummy shark, big flat head, snapper and nannygai fish.
Go Surf School	Marine Tourism	Ocean based activities for locals and visitors.

Organisation Name	Type	Functions, Interests or Activities
Gone Fishing Charters	Marine Tourism	Fishing charter that fishes in Portland (tuna) and Queenscliff (king fish, snapper, gummy shark).
King Island Surf Safaris	Marine Tourism	Ocean based activities for locals and visitors.
King Island Tours	Marine Tourism	Ocean based activities for locals and visitors.
Lakes Entrance Offshore Charters	Marine Tourism	Offers skippered boat charters, fishing trips, crabbing as well as sightseeing charters in the Bass Strait where they catch snapper, gummy shark, flathead, and a range of ocean reef fish.
Port Campbell Boat Charters	Marine Tourism	Fishing and diving charter services. Currently in hiatus but would like to be kept informed of Beach projects.
Pro Red Fishing Charters	Marine Tourism	Charters in and around Melbourne in Port Phillip Bay, Westernport Bay, Bass Strait, and Portland.
Pro-line Fishing Charters	Marine Tourism	Operating from the Southern Ocean, Bass Strait, and Port Philip Bay region.
Reel Affair Fishing Charters	Marine Tourism	Operating from Merimbula.
Salty Dog Charters	Marine Tourism	Marine tourism activity.
Sapphire Coastal Adventures	Marine Tourism	Operating from Merimbula.
Sea Myth Fishing Charters	Marine Tourism	Deep sea charters.
Sharkmen Charters	Marine Tourism	Fishing charter operating tours from Melbourne to Portland.
South-west Expeditions	Marine Tourism	Tourist business West Tasmania, Strahan.
South West Fishing Charters	Marine Tourism	South West Charters offers Deep Sea Fishing, Game Fishing, Bay Fishing, Whale watching, Diving Service
Spindrift	Marine Tourism	Sea kayaking operator
Think Big Fishing Charters	Marine Tourism	Fishing charter for Snapper, Whiting, Gummy Shark, Squid
Wildlife Coast Cruises	Marine Tourism	Licensed tour operator Corner Inlet Marine and Coastal Park.
Apollo Bay Surf Life Saving Club	Volunteer Emergency Services	Responsible for keeping local beaches safe and responding to local rescues.
Beachport Surf Life Saving Club	Volunteer Emergency Services	Responsible for keeping local beaches safe and responding to local rescues.
Lakes Entrance Surf Life Saving Club	Volunteer Emergency Services	Responsible for keeping local beaches safe and responding to local rescues.
Port Campbell Surf Life Saving Club	Volunteer Emergency Services	Responsible for keeping local beaches safe and responding to local rescues.

Organisation Name	Type	Functions, Interests or Activities
Port Fairy Surf Life Saving Club	Volunteer Emergency Services	Responsible for keeping local beaches safe and responding to local rescues.
Portland Surf Life Saving Club	Volunteer Emergency Services	Responsible for keeping local beaches safe and responding to local rescues.
Seaspray Surf Life Saving Club	Volunteer Emergency Services	Responsible for keeping local beaches safe and responding to local rescues.
Venus Bay Surf Life Saving Club	Volunteer Emergency Services	Responsible for keeping local beaches safe and responding to local rescues.
Warrnambool Surf Life Saving Club	Volunteer Emergency Services	Responsible for keeping local beaches safe and responding to local rescues.
Wonthaggi Surf Life Saving Club	Volunteer Emergency Services	Responsible for keeping local beaches safe and responding to local rescues.
Woolamai Beach Surf Life Saving Club	Volunteer Emergency Services	Responsible for keeping local beaches safe and responding to local rescues.
Wye River Surf Life Saving Club	Volunteer Emergency Services	Responsible for keeping local beaches safe and responding to local rescues.

4.7.3 List of Other Persons – 25(1)(e)

Beach has identified the following persons or organisations as a relevant person under regulation25(1)(e).

Organisation Name	Type	Functions, Interests or Activities
3D Oil Ltd	Marine Based Industries	Oil and Gas industry in offshore Otway Basin. Has current permit areas within the Planning Area but no infrastructure or operations.
Australian Energy Producers (AEP)	Marine Based Industries	AEP is the voice of the oil and gas industry on the issues that matter, working collaboratively with industry and the community.
Australian Communications and Media Authority	Commonwealth Government	Australian government agency responsible for the regulation of broadcasting the internet, radio communications and telecommunications. Relevant stakeholder to obtain information in relation to subsea cables or if predicted impact to subsea cables.
Australian Border Force - Maritime Border Command	Commonwealth Government	Responsible for maritime security. Deters and prevents illegal activities in the Australian Marine Domain.
National Offshore Petroleum Safety Environment Management Authority (NOPSEMA)	Commonwealth Government	Regulator for health and safety, structural (well) integrity and environmental management for all offshore oil and gas operations and greenhouse gas storage activities in Commonwealth waters, and in coastal waters where regulatory powers and functions have been conferred.
CO2CRC	Business	A carbon capture and storage research organisation, with its Otway International Test Centre in Nirranda South.
Australian Oceanographic Services Pty Ltd	Business	Services to offshore energy development companies.
Extent	Business	Sea country and cultural heritage
Frying Nemo Fish and Chips	Business	Local tourism trade.
Grassroots Deli Cafe	Business	Local tourism trade.
Great Ocean Road Tourist Park	Business	Accommodation providers in Peterborough.
Lochard Energy	Business	Oil and Gas industry in onshore Otway Basin and owns the Iona Gas Plant in Port Campbell.
Peterborough General Store and Takeaway Food	Business	Local tourism trade.
Peterborough Golf Club	Business	Golf club for locals and tourists.
Peterborough House	Business	Accommodation services.

Organisation Name	Type	Functions, Interests or Activities
Peterborough Licensed grocers	Business	Local tourism trade.
Port Campbell Hotel	Business	Local tourism trade.
Port Campbell Take Away	Business	Local tourism business
Port Campbell Trading Co.	Business	Local tourism business
Port Central Apartments	Business	Local tourism business
Port O' Call Motel	Business	Local tourism business
REAL Pizza Pasta Salads	Business	Local tourism business
Sea Foam Villas Port Campbell	Business	Local tourism business
South West Regional Executive Forum	Business	A forum of local business owners and Government leaders who meet monthly.
Waves Cafe, Bar and Restaurant	Business	Local tourism trade.
Wessex Archaeology	Business	Sea country and cultural heritage
Life Saving Victoria	Community	Water safety
Otway Gas Plant Community Reference Group	Community	Ongoing community representation to receive activity updates on Beach's operations and projects, and have the opportunity to ask questions, raise concerns, and seek feedback. The CRG meets every 4 months, Beach tables reports on operations, projects, safety and environment performance, and social performance initiatives.
Peterborough Residents Association	Community	Volunteer community development and / or environment protection groups in towns adjacent planning area.
Port Campbell Board Riders Association	Community	Surfing and advocating for healthy oceans.
Port Campbell Rifle Range	Community	Local sporting club.
Name withheld	Community	Previously requesting information sheets by post. Beach has continued to share information.
Name withheld	Community	Contacted Beach after seeing public notice. Interested in future gas supplies for Victoria and exports.
Office of the Minister for Agriculture and Minister for Regional Development	State Departments Government	Advises the Victorian Cabinet on matters relating agriculture and regional development.
RecFish West	Tourism/Recreation	Peak body representing game fishers in WA.

4.8 Sufficient Information

4.8.1 Types of Information

Beach has prepared and delivered sufficient information cognisant of regulatory requirements, guidelines, and standards. Information must be sufficient to allow the relevant person to make an informed assessment of the possible consequences of the activity on their functions, interests or activities. The depth of information required, the way it is prepared (short copy, long copy, questions and answers, diagrams, maps), and the way it is delivered, has been adapted to different relevant persons needs and the degree to which they may be affected.

Key types and delivery, purpose and key content and the relevant person focus for the provision of sufficient information are set out in Table 4-6 in chronological order. Copies of information are provided are in Appendix C.

Table 4-6: Provision of Sufficient Information

Information Type	Purpose	Key Content	Relevant Person Focus	Date
OGV Project Summary Information Sheet. Accompanying email.	Introduce context and overview of a range of activities in the OGV Project, including Drilling and P&A, which will require consultation for development of different EPs. Commence review of relevant persons.	• Project overview • Phases & timings • Maps • Regulations • Consultation purpose • How to find out more & consult with Beach • Advice regarding sensitive information.	All in BeachConnect database assigned by Beach to OGV Project as potentially relevant persons	29/05/2023
Beach website.	Information on Beach website provides opportunity for new relevant persons to seek information, self-identify and request consultation.	• OGV Project overview • OGV Project information sheet including Drilling and P&A activity summary.	New potentially relevant persons.	29/05/2023
Drilling and P&A Information Sheet. Accompanying email. Beach website updated.	Provide sufficient information on the Drilling and P&A activities to enable potentially relevant persons to contact Beach to seek further information or consult with Beach. Email to introduce Drilling and P&A information sheet. Invited participation in Beach's community drop-in information sessions.	• Project overview • Phases & timings • Maps • Activity descriptions • Activity diagrams • Environment description • Regulatory approvals • Maritime safety • Q&As on key concerns • How to find out more & consult with Beach • Drop-in information session dates, times, locations	Any organisations or individuals whose functions, interests or activities may be affected by the activity in the EP. Issued to all in BeachConnect *(if not opted out).*	14/07/2023
Public Notice Advertisements: Information Sessions. Webinar.	Announce OGV Project including Drilling and P&A to unknown potentially relevant persons, advise how to find out more, invite consultation, advise public Beach information sessions.	• Start of planning and consultation for OGV Project, including and Drilling and P&A • Consultation purpose • Information sessions • QR code for more info	Unknown potentially relevant persons in regional locations adjacent activity areas and areas of the drop-in information sessions.	July, September, October 2023 *(see schedule below)*
Public Notice Advertisements: Relevant persons identification.	Encourage unknown relevant persons who may be impacted to consult with Beach.	• Project purpose • Activities and timings • EPs and regulations • Consultation purpose • QR code for more info	Unknown potentially relevant persons in regional locations adjacent activity areas.	July, September, October 2023 *(see Advertising schedule below)*

Information Type	Purpose	Key Content	Relevant Person Focus	Date
Radio Advertisements	Encourage unknown relevant persons who may be impacted to consult with Beach.	30 second commercial with overview of OGV Project over several phases, inviting consultation, how to contact Beach.	Unknown potentially relevant persons in regional locations adjacent activity areas.	October 2023 *(see Advertising schedule below)*
Drop-in information sessions	Provide opportunity to consult with Beach technical staff and ask questions or raise concerns. Locations are focussed on community towns adjacent the activity areas.	• Attended by Beach technical staff from environment, drilling, Drilling and P&A project manager and community team. • Information sheets provided. • Posters of maps and diagrams shown.	Key focus is for relevant persons whose functions, interests or activities may be affected by the activity in the EP. Relevant persons in BeachConnect were advised of the sessions via email and sessions were advertised publicly.	July, August, September 2023 *(See summary of information sessions dates, locations and outcomes below)*
Engage Beach online hub	Dedicated engagement website to deliver project and EP consultation information with streamlined navigation, content delivered in multiple different formats, providing another channel to facilitate feedback and inquiry from relevant persons. A prominent link to Engage Beach was included on the home page of Beach's corporate website.	• Long and short content • Q&A on common concerns • Maps • Diagrams • Summary table of risks, impacts, controls for Drilling and P&A Activities • Downloadable information sheets • Purpose of consultation • Questions and feedback form • Invitation to identify functions, interests or activities and join mailing list	Key focus is for relevant persons whose functions, interests or activities may be affected by the activity in the EP, providing detailed information in different formats. Secondary focus is new potentially relevant persons who can request further information and register for ongoing consultation.	10/10/2023
Email	Additional consultation opportunity. Announce Engage Beach online hub. Webinar details.	• Invitation to participate in Drilling and P&A Webinar hosted by Beach technical staff. • Reminder of purpose of consultation. • Link to Engage Beach online hub. • EP will be submitted end of October. • Further EPs will be developed for OGV Project phases.	Key focus is for relevant persons whose functions, interests or activities may be affected by the activity in the EP, and who may not have attended public information sessions but want more information or to ask questions.	11/10/2023

Online Webinar	Provide additional opportunity for consultation and to engage with Beach technical staff about the drilling and P&A activities.	• Presentation including:
		  ○ OGV Project overview
		  ○ Drilling and P&A activities
		  ○ Emergency response planning
		• Q&A session
			Key focus is for relevant persons whose functions, interests or activities may be affected by the activity in the EP, and who may not have attended public information sessions but want more information or to ask questions.	17/10/2023

Fair Ocean Access Information Sheet	Simple explanation of Beach's fishers compensation protocol	Summary of protocol	Potentially impacted commercial fishers	Provided to commercial

Information Type	Purpose	Key Content	Relevant Person Focus	Date
		How to find out more information		fishers on request
Email	Additional consultation opportunity Links to Engage Beach online hub and relevant information sheets.	Confirmed submission of Seabed Assessment EP Reminder of purpose of consultation for Drilling and P&A Invitation to participate in Drilling and P&A Webinar hosted by Beach technical staff.	Key focus is for relevant persons whose functions, interests or activities may be affected by the activity in the EP, and who may not have attended public information sessions but want more information or to ask questions.	14/11/2023
Email	Additional consultation opportunity. Webinar reminder	Reminder to participate in Drilling and P&A Webinar hosted by Beach technical staff.	Key focus is for relevant persons whose functions, interests or activities may be affected by the activity in the EP, and who may not have attended public information sessions but want more information or to ask questions.	21/11/23
Drop-in information session	Provide opportunity to consult with Beach technical staff and ask questions or raise concerns. Location focussed on Lakes Entrance adjacent to the Bass activity area.	Attended by Beach technical staff from environment, drilling, Drilling and P&A project manager and community team. Information sheets provided. Posters of maps and diagrams shown.	Key focus is for relevant persons whose functions, interests or activities may be affected by the activity in the EP. Relevant persons in BeachConnect were advised of the sessions via email and sessions were advertised publicly.	29 November 23 (See summary of information sessions dates, locations and outcomes below)
Online webinar x3	Provide additional opportunity for consultation and to engage with Beach technical staff about the drilling and P&A activities.	Webinar 1 Drilling and P&A Overview Webinar 2 Technical P&A Webinar 3 Technical Drilling	Key focus is for relevant persons whose functions, interests or activities may be affected by the activity in the EP, and who may not have attended public information sessions but want more information or to ask questions. Specific technical webinars were held for both drilling and P&A activities for those wanting a deep dive.	22/11/23 - 30/11/23
Email	Additional consultation opportunity.	Reminder of purpose of consultation. Link to Engage Beach online hub. EP will be submitted end of January 2024. Further EPs will be developed for OGV Project phases.	All in BeachConnect database assigned by Beach to OGV Project as potentially relevant persons.	8/01/24

4.8.2 Information Sessions & Webinar

Beach advertised and held eight regional community drop-in sessions, with flexible timing to facilitate different work and family needs. The purpose of the sessions was to provide an opportunity for consultation directly with Beach technical staff members about the OGV Project and specifically about the Drilling and P&A activities. Face to face consultation gives an opportunity for people with concerns to be listened to, for two-way dialogue and genuine collaboration on control measures where applicable, and a consultation method for those less comfortable with exchanging emails or phone contact. Beach also advertised and held an online webinar, which received a stronger attendance than the drop-in sessions, with representatives from 12 organisations.

Table 4-7 details the schedule of information sessions and the webinar locations, dates, attendees, and consultation summary.

Table 4-7: Summary of Information Sessions and Webinar

Location	Date	Attendees	Concerns, objections, responses where applicable
Port Campbell 4 attendees	24 Jul 2023	Local fisherman & partner	Concerns about fishing impacts from seismic surveys, no interest in OGV Project or Drilling and P&A.
		Community member	OGV Project overview, no questions on Drilling and P&A activities. Beach's sustainability strategy.
		Industry member	Beach's sustainability strategy.
Portland 1 attendee	25 Jul 2023	Community member	General discussion on project overview.
Warrnambool 4 attendees	26 Jul 2023	eNGO group members	Concerns about marine life impact from seismic surveys, Beach explained the OGV Project doesn't require seismic surveys.
		Community member	Asked about Carbon Capture and Storage, Beach shared knowledge and approach in Beach's Sustainability Report.
		LGA staff member	Impacts to local fishing industries and OGV Project location and timeframes. Beach explained its fishing area assessments, consultation with fishers, compensation approach.
Port Fairy 4 attendees	30 Aug 2023	eNGO group members	Impact to Port Fairy generally and why is Beach there. Beach explained its aware of offshore activity interest in the community and wanted to be available for consultation. Asked about Drilling and P&A activities, in particular if it's not a seismic survey then what are we looking for. Explained they are a safety measure to avoid seabed and shallow geological hazards, the equipment used, activities on the sea floor and shallow coring.
		Community member	Asked about OGV Project location and timeframes, Beach explained.
Commercial Fishing Peak Body Forum	31 Aug 2023	Seafood Industry Victoria Seafood Industry Australia	• General discussion on OGV Project and specific discussion on Drilling and P&A activities. Interest in Drilling and P&A was confirmation of the locations of the activity areas, and this was discussed in relation to

Location	Date	Attendees	Concerns, objections, responses where applicable
Warrnambool /Online 3 attendees		Tuna Australia	their fishing areas. No concerns raised about Drilling and P&A activities. • Further general discussions Beach's compensation approach and industry research. Beach compensation policy circulated post forum.
Commercial Fishers Drop-in information session Warrnambool 8 attendees	31 Aug 2023	Seafood Industry Victoria Abalone Council Victoria Abalone Fishermen Southern Rock Lobster Fishermen	• General discussion on OGV Project and specific discussion on Drilling and P&A activities. Asked about impacts to local fishing industries from Beach's activities and timeframes and raised concerns about marine seismic surveys. Beach explained its OGV Project including the Drilling and P&A activities do not require the use of seismic surveys. • Interest in Drilling and P&A was confirmation of the locations of the activity areas, and this was discussed in relation to their fishing areas. No concerns raised about Drilling and P&A activities. • Concerns raised about multiple proponent activities leading to confusion and stakeholder fatigue. Beach explained OGV Project and Drilling and P&A activities and timeframes. • Concerns raised that the compensation approach is based on previous catch rates and does not consider future impact on catch. Beach explained that its compensation procedure does account for future claims where it can be proved impact was caused by Beach activity.
Burnie	20 Sep 2023	Nil attendees	N/A
King Island	21 Sep 2023	Nil attendees	N/A
Webinar online	17 Oct 2023	EPA SA Savour King Island Protect the West Game Fishing Association Australia Recfishwest Corangamite Council Marinus Link Wye River SLSC Department of Natural Resources and Environment Tasmania Land and Sea Aboriginal Corporation Tasmania South Gippsland Council Life Saving Victoria	Beach received questions pertaining to spill response, P&A and seabed footage: • What is the extent or capacity of resources for emergency response? Beach explained it has a contract with AMOSC to manage emergency response. AMOSC have significant resources in terms of people and equipment. Gas proponents would work together to offer expertise and support as well. Beach's emergency response plans have to include its preparedness arrangements, be included in EPs, and be reviewed and accepted by the regulator. • What is the financial capacity to address emergencies? Beach explained that it has insurance in place for these matters. • Asked if the only source of hydrocarbon for a spill risk is diesel? Beach confirmed this was correct and explained that the risk was no more than that from any other ship in the area. • Asked if the seabed footage be available to the public? Beach advised the footage is not usually released to the public. Relevant photos are often included in the EP. We

Location	Date	Attendees	Concerns, objections, responses where applicable
			will share footage with the relevant agencies or any interested parties such as academic or research organisation should they be interested.
Otway Gas Plant Community Reference Group 6 attendees	18 Oct 2023	Corangamite Shire Council Community Reference members	Beach provided an overview of OGV activities. Asked is the Drilling and P&A included seismic surveying. Beach confirmed it does not. No further questions raised.
Webinar online	22 Nov 23	Protect the West	Beach provided an overview of drilling and P&A activities.
Lakes Entrance	29 Nov 2023	Local fishermen	General concern around offshore activities displacing fishing. Particular concern with offshore wind footprint. Requested copies of operational maps which were provided via email.
Webinar online	29 Nov 2023	Moyne Shire Council Greater Geelong Council	Beach provided information specific to our proposed drilling activities. Some questions around the history of abandoned wells. Assurance around no new major infrastructure.
Webinar online	30 Nov 2023	Moyne Shire Council Protect the West	Beach provided information specific to our proposed P&A activities. Questions around timing of P&A activities.

4.8.3 Advertising Schedule

Beach has published two types of public notice advertisements and one type of radio commercial. The purpose, content and relevant person focus for these is explained in Section 4.8.1. The locations, publisher and dates are shown in Table 4-8. Copies of advertisements are provided are in Appendix C.

Table 4-8: Public Notice Advertisements

Local Government Area	Date	Media	Key Purpose
Corangamite Shire, VIC	12 July 2022	Cobden Timboon Coast Times	Advertise information session in Port Campbell
Glenelg Shire, VIC	14 July 2022	The Portland Observer	Advertise information session in Portland and Warrnambool
Corangamite, Moyne, Warrnambool	15 July 2023	The Warrnambool Standard	Advertise information session in Portland and Warrnambool
Corangamite Shire, VIC	26 July 2023	Cobden Timboon Coast Times	Identify unknown potentially relevant persons
Colac Otway Shire, VIC	28 July 2023	Colac Herald	Identify unknown potentially relevant persons
Corangamite, Moyne, Warrnambool, VIC	29 July 2023	The Warrnambool Standard	Advertise information session in Port Fairy

Local Government Area	Date	Media	Key Purpose
Mt Gambier, Limestone Coast, SA	1 Sep 2023	The Border Watch	Identify unknown potentially relevant persons
Burnie, TAS	11 Sep 2023	The Advocate	Advertise information session in Burnie
King Island, TAS	14 Sep 2023	King Island Courier	Advertise information session in King Island
National reach to First Nations audiences	20 Sep 2023	The Koori Mail	Identify unknown potentially relevant persons
National reach to First Nations audiences	26 Sep 2023	National Indigenous Times	Identify unknown potentially relevant persons
South Gippsland Shire, VIC	10 Oct 2023	South Gippsland Sentinel-Times	Identify unknown potentially relevant persons and advertise webinar
East Gippsland Shire, VIC	11 Oct 2023	Bairnsdale Advertiser	Identify unknown potentially relevant persons and advertise webinar
Corangamite Shire, VIC	23 Oct 2023	Cobden Timboon Coast Times	Media release, consultation focus, encouragement to contact Beach
South West VIC	11 – 24 Oct	3CS; Mixx Colac; 3YB; Coast FM	Identify unknown potentially relevant persons
Burnie, TAS	18 November 2023	The Advocate	Identify unknown potentially relevant persons and advertise webinars
Corangamite, Moyne, Warrnambool, VIC	18 November 2023	The Warrnambool Standard	Identify unknown potentially relevant persons and advertise webinars
Glenelg Shire, VIC	21 November 2023	Portland Observer	Identify unknown potentially relevant persons and advertise webinars
South Gippsland Shire, VIC	21 November 2023	South Gippsland Sentinel-Times	Identify unknown potentially relevant persons and advertise webinar
Corangamite Shire, VIC	22 November 2023	Cobden Timboon Coast Times	Identify unknown potentially relevant persons and advertise webinars
Mt Gambier, Limestone Coast, SA	22 November 2023	The Border Watch	Identify unknown potentially relevant persons and advertise webinars
Circular Head, TAS	22 November 2023	Circular Head Chronicle	Identify unknown potentially relevant persons and advertise webinars
East Gippsland Shire, VIC	22 November 2023	Bairnsdale Advertiser	Identify unknown potentially relevant persons and advertise webinar

Local Government Area	Date	Media	Key Purpose
King Island, TAS	23 November 2023	King Island Courier	Identify unknown potentially relevant persons and advertise webinars
Colac Otway Shire, VIC	30 November 2023	Colac Herald	Identify unknown potentially relevant persons and advertise webinars
Corangamite Shire, VIC	23 Oct 2023	Cobden Timboon Coast Times	Media release, consultation focus, encouragement to contact Beach
South West VIC	20 Nov – 1 Dec	3CS; Mixx Colac; 3YB; Coast FM	Identify unknown potentially relevant persons and promote Engage Beach

4.9 Reasonable Period

Consultation on the OGV Project, which includes the Drilling and P&A phase of activities, commenced on 29 May 2023 with a project overview of activities, timings, and locations to initiate requests for further information and engagement.

A detailed information sheet on the Drilling and P&A activities was emailed to relevant authorities, relevant persons and other persons identified by Beach on 14 July 2023. Further information and different consultation opportunities were provided up to the 18 January 2024, as set out in Section 4.8.

Throughout the consultation for this EP, relevant persons were advised that the purpose of consultation was to ensure potential impacts and risks have been identified and appropriate measures adopted because of the consultations, and encouraged to contact Beach if they required further information or wished to discuss how the Drilling and P&A activities may affect their functions, interests, and activities.

Beach understands that what constitutes a reasonable period for consultation should be considered on a case-by-case basis, with reference to the nature, scale, and complexity of the activity. During the consultation for this EP, minimal additional information has been sought, minimal consultation has been sought, no concerns have been raised regarding insufficient time, some minor concerns regarding the Drilling and P&A activities have been raised and resolved.

Commercial fishing peak bodies have been engaged throughout the process and understand that further consultation will be required with specific fishers potentially impacted once Beach has completed its studies and is able to confirm specific well locations.

Beach considers that it has provided reasonable time for consultation and that consultation in the course of preparing this EP has been completed.

4.10 Consultation Methods

Beach understands its regulatory requirements for consultation and that genuine consultation involves a two-way dialogue. Beach also understands that consultation is voluntary for relevant persons, and they are increasingly citing 'stakeholder fatigue'. Therefore, Beach's approach to consultation starts with a focus on building long-term relationships with key relevant persons groups by demonstrating

understanding for their needs, timelines, the types of information they need and their preferred consultation pathways. Beach has actively sought out consultation with potentially impacted relevant persons and has successfully managed to create consultation opportunities, in particular with key Commercial Fishing groups and First Nations groups despite their stated stakeholder fatigue'.

In October 2023, Beach launched OGV Project – Drilling and P&A information and consultation pages on its online consultation hub, Engage Beach. In November 2023, Beach distributed emails to relevant persons promoting three upcoming information webinars and directing recipients to Engage Beach for further project information and another opportunity to consult. The OGV Project – Drilling and P&A pages saw increased activity with 25 unique visitors and 32 views on the day the email was distributed. A follow up email was sent a week later reminding recipients to register for the upcoming webinars. The pages again saw increased activity with 24 unique visitors and 39 views on the day the email was distributed. Since the OGV Project – Drilling and P&A pages were launched, the pages have had 191 unique visitors and 461 views.

Beach used radio adverts for the first time in our recent Seabed Assessment consultation and observed no benefit from this campaign in identifying any new relevant persons. We ran a further radio campaign in South West Victoria during November for the drilling consultation to trial the medium again. The South West Victoria region was chosen as our major gas plant is ion the region and the firm wells for the OGV project are offshore of this region. No benefit was seen from the further campaign and Beach decided to not pursue radio adverts further at this time.

Beach recognises that the level of consultation is dependent on the nature and scale of the activity, and the potential impacts on the relevant persons functions, interests, or activities. Therefore, that the consultation process should be appropriate for the category of relevant persons and that not all persons or organisations will require the same level of engagement. Table 4-9 shows how Beach has adapted the IAP2 Spectrum of Public Participation model, noting that the fifth level of participation being 'empower' is not applicable in the context of safely performing offshore petroleum activities in accordance with OPGGS(E)R.

Table 4-9: IAP2 Spectrum of Public Participation – Applied for consultation on this EP

	Inform	Consult	Involve	Collaborate
Relevant person focus	• Relevant persons identified from Beach methodology and desktop research. • Self-identified relevant persons from public notices and meetings.	• Those seeking further information or who raise concerns. • Fishing associations. • First Nations groups. • Relevant government departments and agencies.	• Potentially impacted commercial fishers and marine users. • First Nation groups to identify cultural values and sensitivities. • Relevant government departments and agencies.	• Impacted commercial fishers/ • Industry proponents who may be conducting activities in similar locations and times.
Consultation methods	• Information sheets • Beach Website. • Email to Beach database. • Beach online Engagement Hub • Regional public notices introducing the project and inviting self-identification as relevant person. • Targeted public notices for drop-in information session. • Media releases.	• Direct response to questions & concerns (email/phone/meetings) • Phone follow up to potentially impacted RPs who haven't replied. • Email follow up to other no-replies. • Beach online Engagement Hub to encourage questions and consultation. • Request meetings with regional community groups. • Hold community drop-in information sessions.	• Follow up non-responses to verify contact details, receipt of Beach emails, if they wish to be consulted. • Request meeting to confirm functions, interests and activities, and potential impacts to fishers. • Request meetings with First Nations Groups to identify consultation preferences, cultural values & sensitivities. • Director of National Parks • Seek input from relevant marine park management authorities/ • Replies to government responses such as UXO	• Request meetings / workshops with associations (in the first instance) to agree on impact assessments, mitigation measures, any research requirements, and compensation approach where applicable. • Individual meetings with commercial fishers confirmed as impacted, to identify mitigations or control measures, and where required, agree on compensation.

4.11 Consultation to Minimise Impacts on Relevant Person's Rights

In accordance with sections 280 and 460 of the OPGGS Act, petroleum activities must not interfere with navigation, fishing, conservation of resources of the sea and seabed, other offshore electricity infrastructure and petroleum activities, and the enjoyment of native title rights and interests (within the meaning of the Native Title Act 1993) to a greater extent than is necessary for the reasonable exercise of the titleholder's rights and obligations.

Beach has consulted with other petroleum industry operators in the vicinity of its proposed Drilling and P&A and no concerns were raised.

With regard to native title rights, Beach has detailed how it has undertaken and extensive assessment of First Nations relevant persons (Section 4.6.6) and its approach to consulting with First Nations groups (Section 4.5.2) to ascertain whether the Drilling and P&A activities would impact their functions, interest and activities, and where applicable, their native title rights. No concerns were raised about the Drilling and P&A activities.

4.11.1 Commercial Fishing Industry Consultation

Beach has developed long-term respectful relationships with the Commercial Fishing industry operating in the Otway and Bass Basins. After consulting with key industry associations, Beach established a peak body round table group to facilitate efficient, productive, and transparent consultation across the different fisheries.

For the initial meeting of the peak body groups, Beach invited:

- Seafood Industry Victoria (SIV)
- South East Trawl Fishing Industry Association (SETFIA)
- Commonwealth Fishing Association (CFA)
- Seafood Industry Australia (SIA)
- Seafood Industry Tasmania (SIT) (formerly TSIC)
- Tuna Australia (TA)
- Victorian Fisheries Authority (VFA)

The first meeting was attended by: SIV; SIA; and Tuna Australia. Further meetings will be held on an as-needs basis (as per direction from the groups). General matters discussed included fisheries impacts research, stakeholder fatigue, compensation approach, and petroleum exclusion zones, but no specific concerns were raised regarding Drilling and P&A due to the minimal disturbance impacts over a short time frame.

Other groups intending to participate include: SETFIA, VFA, and SIT. The CFA advised they were unable to participate in consultation due to limited resources and directed Beach to dedicated fishery associations, which Beach understands given their role as an umbrella group.

Given the shared marine rights and protections afforded for both the offshore petroleum and commercial fishing industries, Beach respects those rights an undertakes a methodical approach to identifying fishing operations within its operating areas, the potential impacts of its activities, assessing mitigations and controls that may include compensation where there is no effective mitigation or control. The following key steps set out the approach Beach has taken for consultation in this EP, and that Beach would continue to take in the event of a new relevant person being identified or new information emerging regarding an impact:

- Provide information sheet to relevant fishing associations, request direct meetings to provide opportunity for detailed discussion, response to questions, concerns and further information requests.
- Seek information on actual fishing effort and seek support (including costing proposals where applicable) for engagement with their members, either directly or via the association as applicable.
- Provide additional information to interested fishery groups where requested.
- Send follow up emails and phone key associations and fishers who may fish in the operating area.
- Where fishers have advised they may be potentially impacted by the activity the following steps would be followed:
    - For fishers who have contacted their associations, Beach would consult with the association to gather information about the fisher's fishing patterns and locations and to establish contact for ongoing consultation throughout the activity.
    - For fishers who have contacted Beach directly, engage with them and gather information about their fishing patterns and locations and to establish contact for ongoing consultation throughout the activity.
    - Where fishers provide Beach with sensitive fishing data, advise the information will be treated as 'sensitive' and not published by NOPSEMA. Provide Beach's privacy policy where requested.
- Beach has previously and will continue to offer SMS messaging to commercial fishers and their associations to provide updates before, during and after the activity.
- Beach will provide regular updates on the locations that the vessel will be operating in as well as the expected duration so fishers can plan their fishing activities with the least disruption.
- Beach has a stated position that fishers should not suffer an economic loss as a result of our activities. Beach's Fair Ocean Access – Procedure for Compensation Claims from Commercial Fishers is explained in clear and simple language in the Fair Ocean Access Information Sheet (Appendix D). It summarises Beach's procedures for minimising and mitigating potential impacts to commercial fishing and procedures for compensation claims from commercial fishers. Beach will ensure that the evidence required is not burdensome on the fisher while ensuring genuine claims are processed.

4.12 Assessment of Merit of Objections or Claims

Any objections or claims raised during consultation will be substantiated via evidence such as publicly available credible information and/or scientific or fishing data. Where the objection or claim is substantiated, where applicable, it will be assessed as per the Beach impact and risk assessment process and controls applied where appropriate to manage impacts and risks to an acceptable level and ALARP.

Relevant persons will be provided with feedback as to whether their objection or claim was substantiated, and if not why, and if it was substantiated, how it was assessed and if any controls were put in place to manage the impact or risk to an acceptable level and ALARP.

If an objection or claim is raised after acceptance of this EP and the matter necessitates a revision of the EP this will be managed in accordance with Beach Management of Change processes (Section 8.3.4) and the relevant person will be advised of the process.

4.13 Measures Adopted as a Result of Consultation

Objection or Claim Raised	Beach's Assessment of Merit for Drilling and P&A Activities	Measures Adopted
Director of National Parks (DNP) requested Beach Energy review the BIAs as outlined in the Australian Marine Parks Science Atlas and if required, update the BIA tables accordingly for these project. BIAs and KEF are identified values of the South-east Network of Marine Parks, and it is expected that activities that could affect these BIAs are managed accordingly.	Beach has been using the South-east Commonwealth Marine Reserves Network Management Plan 2013 -2023 to identify values of the AMPs. We have looked at the Australian Marine Parks Science Atlas upon guidance from DNP.	Beach updated the EP (Section 6.2.2) to include the BIAs and KEF associated with the AMPS as per the Australian Marine Park Science Atlas. These values were included in the impact and risk assessment sections where relevant to: • manage impacts and risks to Australian marine park values (including ecosystem values) to an acceptable level and consider all options to avoid or reduce them to as low as reasonably practicable. • clearly demonstrate that the activity will not be inconsistent with the relevant legislation listed in the class approval.
DNP considers operational areas to encompass the active source and acquisition areas and includes operational activities such as line turns / repositioning, equipment maintenance, deployment and recovery, crew change and resupply. These are offshore petroleum activities and should be identified in the EP to ensure risks to AMPs are assessed and effective mitigation applied.	Beach confirmed that there will be no seismic activity, active source etc. as part of the Drilling Program. Crew change and resupply of the drill rig will occur within the Operational Area.	Additional measures not deemed necessary.
DNP would like notification of activity start and end dates plus notification of any spill.	Beach acknowledged DNP response and confirmed that the EP has been updated to include the following: • Emergency responses reporting requirements. • Activity commencement and cessation notifications.	Section 8.3.1 was updated to include DNP emergency responses reporting requirements. Section 4.16 was updated to include DNP Activity commencement and cessation notifications.
Department of Defence – Australian Hydrographic Office	Beach has mapped our activity operational areas with the available UXO information from the Department of Defence database. This has identified that the Operational Areas in the Otway Basin overlap UXO Zone 1052 King Island which is within the 'slight	A seabed survey (CM05: Seabed Survey) will be undertaken prior to the commencement of the Drilling Program to allow for the consideration of unexploded ordinances in the final selection of well locations and drill rig position and location of mooring equipment

Objection or Claim Raised	Beach's Assessment of Merit for Drilling and P&A Activities	Measures Adopted
	potential' category' and UXO Zone SDG087 'Sea Dumping – King Island'. Prior to any seabed disturbance activities a geophysical survey will be undertaken to identify any potential UXO.	(CM06: Drill Rig Mooring Plan and CM09: Drilling Program).
South East Trawl Fishing Industry Association (SETFIA).	Beach commissioned SETFIA to produce a comprehensive report of fishing effort plus a risk analysis and identification of fishing gear in the proposed OGV Project areas. SETFIA highlighted that most fishing effort, particularly trawl is between 400 and 1,000m isobath. Beach values its ongoing constructive relationship the commercial fishing sector as a priority and is committed to its Fair Ocean Access Policy. Beach acknowledges the advice provided by commercial fishing experts. Beach will continue to seek full support from fishing peak bodies to engage with any members potentially impacted prior to the commencement of the next activities. Should new information be received on fishing locations in relation to the activities in this EP, Beach will assess any new matters and where appropriate, Beach will apply its Management of Change Standard (section 8.3.4).	CM09: Drilling Program. Beach will implement an activity limitation where wells will not be located in water depths >400 m. This applies to the T/30P Operational Area where waters depths range from 55–992 m (T/30P South OA) and 111–578 m (T/30P North OA). Water depths >400 m have not been fully excluded from the activity as anchors may be required in these waters depths depending on the final well location. This limitation reduces any potential impact to commercial trawl and giant crab fisheries that were identify by SETFIA (2023) as having most fishing effort between the 400 and 1,000 m isobath. SETFIA (2023) recommended that Beach avoid depths between the 400-1000 m isobaths to minimise the impact on fishing. CM03: Consultation for Implementation of EP Consultation with commercial fishing associations (and individual commercial fishers where identified) regarding well locations, the ongoing communication of Beach activities to their members, and applying CM04: Beach Fair Ocean Access Procedure.
Wildlife Coast Cruises asked whether our environmental plans aim to engage with local stakeholders such as themselves to obtain ongoing and historical data of the humpback and southern right whale migration that may be affected by this project.	The EP includes a description of the available historical data for humpback and southern right whale migration in the Otway and Bass areas (Section 6.4.7.6). It also assesses potential impacts from the rig and support vessels such as underwater sound (Section 7.4) and vessel collision (Section 7.10) to	Additional measures not deemed necessary.

Objection or Claim Raised	Beach's Assessment of Merit for Drilling and P&A Activities	Measures Adopted
	whales and details the controls such as vessel speeds, separation distances and use of marine mammal observers to ensure impacts are of an acceptable level. Beach contacted stakeholder welcoming any ongoing and historical data for humpback and southern right whales. Beach has followed up but has had no reply.	
Heritage Victoria and First People State Relations highlighted that proponents should be mindful that traditional owners do not always recognize state boundaries.	Beach does not consider state boundaries when assessing the marine environment. The environment is transboundary, so we assess the existing environment (including socio-economic) in a spatial extent rather than referring to specific state boundaries.	Additional measures not deemed necessary.
Heritage Victoria and First People State Relations said that the UNESCO protection of underwater cultural heritage standards likely be ratified "soon".	Section 5 identifies in-force legislation including the Underwater Cultural Heritage Act 2018. Beach will take into consideration any new UNESCO Protection of Underwater Cultural Heritage standards to the extent that is applicable to the activities in this EP.	Additional measures not deemed necessary.
Heritage Victoria and First People State Relations recommended that Beach undertake an underwater cultural heritage assessment and the methodology and procedure for cultural heritage findings should be informed/endorsed by an archaeologist. Archaeologist should have experience with Aboriginal submerged landscape	Beach acknowledges the recommendation. In the event that cultural heritage is found, an appropriate cultural heritage management plan may be required, and, in such case, Beach will consult with an appropriately qualified underwater archaeologist.	CM05: Seabed Survey A seabed survey will be undertaken prior to the commencement of the Drilling Program to allow for the consideration of the submerged cultural heritage and landscapes in the final selection of well locations and drill rig position and location of mooring equipment. Data from seabed surveys will be provided to an appropriately qualified underwater archaeologist to identify submerged cultural heritage and landscapes and provide an Underwater Cultural Heritage Report to Beach. Beach will assess the report and identify any areas of overlap and potential risks from proposed activities defined in this EP.

Objection or Claim Raised	Beach's Assessment of Merit for Drilling and P&A Activities	Measures Adopted
		Beach will share relevant information and assessments from the Seabed Survey, relevant to submerged cultural heritage and landscapes with relevant First Nations groups as identified in Section 6.6.2. Should any submerged cultural heritage be identified, Beach will report the findings in accordance with the *Underwater Cultural Heritage Act* 2018, and will consult with the relevant First Nations groups (as identified in Section 6.6.2) and determine any exclusion areas or further cultural heritage management procedures that may be required. Should any potential submerged cultural landscapes be identified, in consultation with the qualified underwater archaeologist, Beach will assess the report and identify any areas of overlap and potential risks from proposed activities defined in this EP. Beach will also consult with relevant First Nations groups (see 6.6.2) and determine any exclusion areas or further cultural heritage management procedures that may be required. The findings of Munkura v Santos will be applied in the assessment and consultation processes set out above.
Heritage Victoria and First People State Relations recommends inductions for staff on cultural heritage informing what to look out for and developing an understanding of First Nations connection to sea country.	Beach acknowledges that cultural awareness in the offshore Sea Country environment may be beneficial for increased awareness of relevant First Nation's groups by staff and contractors.	Beach will include Sea Country awareness applicable to the Operational Areas in the Drilling Program induction materials (Section 8.2.2).
Heritage Victoria and First People State Relations requested Beach consider publishing reports as and when cultural heritage data is available.	Beach acknowledges that it may be beneficial to publish information that may build knowledge of underwater cultural heritage. However, Beach is cognizant that some information may be sensitive to relevant First	CM05: Seabed Survey.

Objection or Claim Raised	Beach's Assessment of Merit for Drilling and P&A Activities	Measures Adopted
	Nations groups, and is prepared to consider this suggestion in consultation with relevant First Nations groups, on a case by case basis.	
Seafood Industry Tasmania SIT)/Tasmanian Seafood Industry Council (TSIC) questioned whether King Island fishers had been adequately consulted.	Beach has been sharing information with SIT/TSIC since May 2023. Beach visited King Island twice to meet with both council and other relevant persons following advertised public information sessions. SETFIA report and Tasmanian fishery data identify a low level of fishing for the rock lobster fishery in T/30P and Bass. Beach will continue to consult after final drilling locations are determined for implementation of this EP.	CM03: Consultation for Implementation of EP CM04: Beach Fair Ocean Access Procedure
Seafood Industry Victoria's Victorian Rock Lobster Committee raised that compensation mechanisms need to reflect the unique attributes of the species and the Victorian coastline and habitat.	Beach's current compensation procedure purposely includes a mechanism for an adaptive methodology where applicable. Beach would seek to use an adaptive mechanism where required for Relevant Persons directly impacted, recognising no location, activity or species is the same. Beach and SIV agreed to have further discussions once the exact well locations are known, and impacted parties are identified. This will include the development of any adaptive compensation mechanisms that may be required.	CM03: Consultation for Implementation of EP CM04: Beach Fair Ocean Access Procedure

4.14 Sensitive Information

Within information sheets and online content, Beach has included the following information:

"Relevant persons may request that the information they provide not be published, and it will be identified a s sensitive information and not published in the Environment Plans."

4.15 Report on Consultations

The report on consultations provides details of the information sent to relevant persons, response received including concerns raised about impacts and risk to their functions, interests, and activities from the activities in the EP, assessments of the concerns raised, and responses to those concerns.

Where an objection or claim was raised by a relevant person, they were provided feedback as to whether the objection or claim was substantiated, how it was assessed and if any additional controls were required to manage the impact or risk to an acceptable level and ALARP. Where an objection or claim was substantiated via evidence such as publicly available credible information and/or scientific or fishing data, this was assessed as per the impact and risk assessment process detailed in Section 2 and controls applied where appropriate to ensure impacts and risks are managed to an acceptable level and ALARP.

The report on consultations can be found in Appendix A.

Copies of the full text of any response by a relevant person have been provided to NOPSEMA as a Sensitive Information under Section 26(8) of the OPGGS(E)R.

4.16 Consultation for Implementation of EP

Consultation in the course of preparation of the EP has been completed in accordance with the OPGGS(E)R. Beach engages in ongoing consultation and communications during the implementation of this EP and Relevant Persons can provide feedback to Beach on any new relevant matters that may emerge. Beach will assess any new matters and where appropriate, Beach will apply its Management of Change Standard (Section 8.3.4).

Beach will continue to consult with relevant persons to meet Section 22(15) of the OPGGS(E)R. This includes providing updates and notices for the OGV Project phases and other future activities, including the Drilling and P&A, to keep relevant persons informed as information becomes available. This will be done via one-on-one communications, emails, and provision of information on the Beach website. Records of ongoing consultations will be maintained in Beach's database BeachConnect.

Table 4-10 details the ongoing consultation requirements for implementation of the activity.

Table 4-10: Consultation Requirements for Implementation of EP

Relevant person	Consultation	Timing
All relevant persons	Activity updates including acceptance of EP and start and completion of activities.	As required
Relevant First Nations groups (section 6.6.2)	Consultation regarding identified cultural heritage and cultural landscapes in accordance with Control Measure 19: Seabed Survey in this EP.	As required

Relevant person	Consultation	Timing
Relevant Commercial Fishing Associations	Consultation regarding well locations, the ongoing communication of Beach activities to their members, and applying Control Measure 04: Beach Fair Ocean Access Procedure.	After determination of well locations
Relevant persons identified as marine users and relevant government departments and agencies	Notifications of activity commencement, including: • type of activity, including pre-lay of anchors and buoys, towing of the drilling rig to first and subsequent locations, supply vessel contact details and proposed routes. • location of activity, coordinates, and map. • timing of activity: expected start and finish date and duration. • sequencing of locations if applicable. • vessel details including call sign and contact. • any safety exclusion zones required. • Beach contact details. Note: coordinates to be provided as degrees and decimal minutes referenced to the WGS 84 datum.	2 weeks prior to activity commencing
AHO	Vessel contractor to issue notification of activity for publication of notices to mariners (NOTMAR), including: • type of activity. • geographical coordinates of activity. • any exclusion zones required. • period that NOTMAR will cover (start and finish date). • vessel details including name, Maritime Mobile Service Identity (MMSI)), satellite communications details (including INMARSAT-C and satellite telephone), contact details and call signs. • Beach and vessel Contractor contact details. Update AHS of progress, changes to the intended operations including if activity start or finish date changes.	4 weeks prior to activity commencing
AMSA - JRCC	Vessel Contractor to issue notification of activity for promulgation of radio navigation warnings, including: • type of activity. • geographical coordinates of activity. • any exclusion zones required. • period that warning will cover (start and finish date). • vessel details including name, call-sign and Maritime Mobile Service Identity (MMSI)), satellite communications details (including INMARSAT-C and satellite telephone numbers), contact details and calls signs. • any other information that may contribute to safety at sea. • Beach and vessel Contractor contact person. Update AMSA JRCC of progress, changes to the intended operations including if activity start or finish date changes.	48 – 24 hours prior to activity commencing
NOPSEMA and Director of National Parks	Regulatory notification of start of activity.	10 days prior to activity commencing

Relevant person	Consultation	Timing
Relevant Persons who have requested vessel location information.	SMS or email messaging undertaken where requested by Relevant Person.	During activity
NOPSEMA and Director of National Parks	Regulatory notification of cessation of activity.	Within 10 days of activity completion

5 Environmental Requirements

This section provides information on the requirements that apply to the activity, and includes relevant laws, codes, other approvals and conditions, standards, agreements, treaties, conventions, or practices (in whole or part) that apply to the jurisdiction that the activity takes place in.

The proposed activity is located in Commonwealth waters. Commonwealth legislation including relevant international conventions and other requirements relevant to the Drilling Program are summarised in Table 5-2.

On the basis that a worst-case credible spill has the potential to intersect Victorian, Tasmanian and New South Wales (NSW) waters. Relevant Victorian requirements are described in Table 5-3. Relevant Tasmanian requirements are described in Table 5-4 and NSW requirements are described in Table 5-5.

Recovery plans, threat abatement plans and species conservation advice applicable to species are detailed in the description of threatened and migratory species (Section 6).

5.1 EPBC Act Primary Approval

The Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) is the key legislation regulating projects that may have an impact on matters of national environmental significance (MNES). The Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) is the Regulator of the EPBC Act.

In February 2014, NOPSEMA became the sole designated assessor of petroleum and GHG activities in Commonwealth waters in accordance with the Minister for the Environment's endorsement of NOPSEMA's environmental authorisation process under Part 10, section 146 of the EPBC Act. Under the streamlined arrangements, impacts on the Commonwealth marine area by petroleum and GHG activities are assessed solely through NOPSEMA.

NOPSEMA are the regulator for the OPGGS(E)R that requires that:

6 (1). Before commencing an offshore project, a person must submit an offshore project proposal for the project to NOPSEMA.

6 (2) However, subregulation (1) does not apply if the Environment Minister:

(a) has made a decision under section 75 of the EPBC Act that an action that is equivalent to or includes the project is not a controlled action; or

(b) has made a component decision under section 77A of the EPBC Act that a particular provision of Part 3 of that Act is not a controlling provision for an action that is equivalent to or includes the project, because the Minister believes the action will be taken in a particular manner; or

(c) has approved, under Part 9 of the EPBC Act, the taking of an action that is equivalent to or includes the project.

The drilling of exploration and appraisal wells and P&A activities within the scope of this EP do not trigger the requirements for an offshore project proposal (OPP) as the activity is not an offshore project under the definition of the regulations.

The completion of Yolla 7 in production licence T/L1 does trigger the OPP requirement, however, this activity is covered by an existing Environmental Impact Statement (EIS) and resulting EPBC Decision 2001/321. Thus, an OPP is not required to be submitted to NOPSEMA for this activity.

EPBC Decision 2001/321 gave the previous titleholder approval, with conditions, to construct and operate the production wells in the Yolla gas field, the Yolla offshore production facility, the onshore and offshore pipelines, an onshore gas treatment and compression plant and an onshore pipeline. As the development includes drilling of production wells, approved under Part 9 of the EPBC Act, no further approvals are required.

On 14 June 2015, the approval conditions under EPBC 2001/321 were subject to a variation given the transfer of powers under the EPBC Act to NOPSEMA under the OPGGS Act. Specifically, conditions that are relevant to this EP are included in Table 5-1. Conditions are based on those in the Variation to Conditions Attached to Approval issued on the 14 June 2015.

Table 5-1: Conditions from the Yolla Gas Field Development Project (EPBC 2001/321) Applicable to the T/L1 (Yolla 7) Well

Condition No.	Condition	Relevant Section of EP
1	The person taking the action must submit for the Minister's approval, prior to commencing offshore drilling, an Offshore Environmental Management Plan which addresses the following matters: • monitoring acoustic noise during construction and operation; and • details of hydrotest water additives and drilling muds to demonstrate low toxicity. The approved plan must be implemented.	See Condition 5
3	The person undertaking the action must not commence decommissioning unless an environment plan that includes measures related to decommissioning is in force under the OPGGS Environment Regulations. The person taking the action must comply with the environment plan.	This Environment Plan is taken to fulfil the commitments under EPBC 2001/321.
5	A plan required by Condition 1 is automatically deemed to have been submitted to, and approved by, the Minister if the measures (as specified in the relevant condition) are included in an environment plan (or environment plans) relating to the taking of the action that: a) was submitted to NOPSEMA after 27 February 2014; and b) either: i) is in force under the OPGGS Environment Regulations; or ii) has ended in accordance with regulation 25A of the OPGGS Environment Regulations.	This Environment Plan is taken to fulfil the commitments under EPBC 2001/321.
5A	Where a plan required by Condition 1 has been approved by the Minister and the measures (as specified in the relevant condition) are included in an environment plan (or environment plans that: a) was submitted to NOPSEMA after 27 February 2014; and b) either: i) is in force under the OPGGS Environment Regulations; or	N/A

Condition No.	Condition	Relevant Section of EP
	ii) has ended in accordance with regulation 25A of the OPGGS Environment Regulations. the plan approved by the Minister no longer needs to be implemented.	
5B	Where an environment plan, which includes measures specified in the conditions referred to in Conditions 5 and 5A above, is in force under the OPGGS Environment Regulations that relates to the taking of the action, the person taking the action must comply with those measures as specified in the environment plan.	N/A

5.2 Commonwealth Requirements

Table 5-2: Commonwealth Environmental Requirements Relevant to the OGV Drilling Program

Requirements	Scope	Related International Conventions	Administering Authority
Aboriginal and Torres Strait Islander Heritage Protection Act 1984	The Aboriginal and Torres Strait Islander Heritage Protection Act 1984 enables the Australian Government to protect important Indigenous areas and objects under immediate threat, if it appears that state or territory laws have not provided effective protection. Areas or objects protected under this Act are included in the National Heritage List and Commonwealth Heritage List. **Application to activity**: Areas or objects protected under this Act may be present within the Operational and Planning Areas as detailed in Section 6.6.	-	Department of Climate Change, Energy, the Environment and Water (DCCEEW)
Australian Ballast Water Management Requirements (CoA 2020)	The Australian Ballast Water Management Requirements set out the obligations on vessel operators with regards to the management of ballast water and ballast tank sediment when operating within Australian seas. **Application to activity**: Provides requirements on how vessel and rig operators should manage ballast water when operating within Australian seas to comply with the Biosecurity Act. Section 7.9 details how the requirements applicable to the activity will be met.	International Convention for the Control and Management of Ships' Ballast Water and Sediments (adopted in principle in 2004 and in force on 8 September 2017)	Department of Agriculture, Fisheries and Forestry (DAFF)
Australia Biofouling Management Requirements (DAWE 2022)	The Australian biofouling management requirements set out vessel operator obligations for the management of biofouling when operating vessels under biosecurity control within Australian territorial seas. **Application to activity**: Provides requirements on how vessel and rig operators should manage biofouling when operating within Australian seas to comply with the Biosecurity Act. Section 7.9 details how the requirements applicable to the activity will be met.	International Convention for the Control and Management of Ships' Ballast Water and Sediments (adopted in principle in 2004 and in force on 8 September 2017)	DAFF
Australian Maritime Safety Authority Act 1990	This Act facilitates international cooperation and mutual assistance in preparing and responding to a major oil spill incident and encourages countries to develop and maintain an adequate capability to deal with oil pollution emergencies.	International Convention on Oil Pollution Preparedness, Response and Cooperation 1990	Australian Maritime Safety Authority (AMSA)

Requirements	Scope	Related International Conventions	Administering Authority
	Requirements are effected through Australian Maritime Safety Authority (AMSA) who administers the National Plan for Maritime Environmental Emergencies (NatPlan). **Application to activity**: AMSA is the designated Control Agency for oil spills from vessels in Commonwealth waters. These arrangements are detailed in the OPEP.	Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances, 2000 International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties 1969 Articles 198 and 221 of the United Nations Convention on the Law of the Sea 1982	
Biosecurity Act 2015 Biosecurity Regulations 2016 Biosecurity Amendment (Biofouling Management) Regulations 2021	This Act is the primary legislation for the management of the risk of diseases and pests that may cause harm to human, animal or plant health, the environment and the economy. The objects of this Act are to provide for: (a) managing biosecurity risks; human disease; risks related to ballast water; biosecurity emergencies and human biosecurity emergencies; (b) to give effect to Australia's international rights and obligations, including under the International Health Regulations, the Sanitary and Phytosanitary Agreement and the Biodiversity Convention. **Application to activity**: The Biosecurity Act and regulations apply to 'Australian territory' which is the airspace over and the coastal seas out to 12 m from the coastline. For the activity the Act and regulations regulates vessels and rigs entering Australian territory regarding ballast water and hull fouling. Section 7.9 details how the requirements applicable to the activity will be met.	International Convention for the Control and Management of Ships' Ballast Water and Sediments (adopted in principle in 2004 and in force on 8 September 2017)	DAFF
Climate Change Act 2022 Climate Change (Consequential Amendments) Act 2022	The Act sets out Australia's greenhouse gas emissions reduction targets. It outlines Australia's greenhouse gas emissions reduction targets of a 43% reduction from 2005 levels by 2030 and net zero by 2050; requires the minister to prepare and table an annual climate change statement; requires the Climate Change Authority to give the minister advice in relation to the annual statement and future greenhouse gas	The Act itself does not impose obligations directly on companies, but its passage into law sets the scene for sector-based reforms to implement the 2030 target and emissions budget, which will impact businesses.	DCCEEW

Requirements	Scope	Related International Conventions	Administering Authority
	emissions reduction targets; and provides for periodic reviews of the operation of the Act. The Act operates as 'umbrella' legislation to implement Australia's net-zero commitments and codifies Australia's net 2030 and 2050 GHG emissions reductions targets under the Paris Agreement. **Application to activity**: GHG requirements are detailed in Section 7.3.	The Safeguard Mechanism reforms, which will apply principally to the industrial and resources sectors, is one such measure.	
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	This Act applies to actions that have, will have or are likely to have a significant impact on matters of national environmental or cultural significance. The Act protects Matters of National Environmental Significance (MNES) and provides for a Commonwealth environmental assessment and approval process for actions. There are eight MNES, these being: • World heritage properties • Ramsar wetlands • listed Threatened species and communities • listed Migratory species under international agreements • nuclear actions • Commonwealth marine environment • Great Barrier Reef Marine Park • water trigger for coal seam gas and coal mining developments **Application to activity**: Petroleum activities are excluded from within the boundaries of a World Heritage Area (Sub regulation 10A(f)). The activity is not within a World Heritage Area. The EP must describe matters protected under Part 3 of the EPBC Act and assess any impacts and risks to these. Section 6 describes matters protected under Part 3 of the EPBC Act. The EP must assess any actual or potential impacts or risks to MNES from the activity. Section 7 provides an assessment of the impacts and risks from the activity to matters protected under Part 3 of the EPBC Act.	1992 Convention on Biological Diversity and 1992 Agenda 21 Convention on International Trade in Endangered Species of Wild Fauna and Flora 1973 Agreement between the Government and Australia and the Government of Japan for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment 1974 Agreement between the Government and Australia and the Government of the People's Republic of China for the Protection of Migratory Birds and their Environment 1986 Agreement between the Government of Australia and the Government of the Republic of Korea on The Protection of Migratory Birds 2006 Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971 (Ramsar) International Convention for the Regulation of Whaling 1946	DCCEEW

Requirements	Scope	Related International Conventions	Administering Authority
		Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) 1979	
Environment Protection and Biodiversity Conservation Regulations 2000	Part 8 of the regulations provide distances and actions to be taken when interacting with cetaceans. **Application to activity**: The interaction requirements are applicable to the activity in the event that a cetacean is sighted. Section 7.10 details how the requirements applicable to the activity will be met.	-	DCCEEW
Environmental Protection (Sea Dumping) Act 1981	The Sea Dumping Act regulates the loading and dumping of waste at sea and the creation of artificial reefs in Australian waters. Australian waters stretch from the low-water mark of the Australian shoreline out to 200 nm. **Application to activity**: For P&A activities, removal of well infrastructure is planned and does not trigger requirements under the Environmental Protection (Sea Dumping) Act 1981.	Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 (the London Convention)	DCCEEW
Marine Pest Plan 2018–2023: National Strategic Plan for Marine Pest Biosecurity	Australia's national strategic plan for marine pest biosecurity. It outlines a coordinated approach to building Australia's capabilities to manage the threat of marine pests over the next five years. It represents agreed priorities and actions of governments, marine industries, and other stakeholders to achieve a common purpose: to manage the risks posed by marine pests and minimise their potential harm to marine industries, communities and the environment. **Application to activity**: Applying the recommendations within this document and implementing effective biofouling controls can reduce the risk of the introduction of an introduced marine species Section 7.9 details how the requirements applicable to the activity will be met.	-	DAFF
Minamata Convention on Mercury	Australia ratified the Minamata Convention on 7 December 2021. The Minamata Convention on Mercury is an international treaty that seeks to protect human health and the environment from anthropogenic (caused by humans) emissions and releases of mercury and mercury compounds.	Minamata Convention on Mercury	DCCEEW

Requirements	Scope	Related International Conventions	Administering Authority
	The Convention covers all aspects of the life cycle of mercury, controlling and reducing mercury across a range of products, processes and industries. This includes controls on: • Mercury mining. • Manufacture and trade of mercury and products containing mercury. • Disposal of mercury waste. • Emissions of mercury from industrial facilities. Countries that have ratified the Convention are bound by international law to put these controls in place. **Application to activity**: Hg may be present in drill fluid additives such as barite. . Section 7.8 details how the requirements applicable to the activity will be met.		
National Biofouling Management Guidelines for the Petroleum Production and Exploration Industry (MPSC 2018)	The guidance document provides recommendations for the management of biofouling risks by the petroleum industry. **Application to activity**: Applying the recommendations within this document and implementing effective biofouling controls can reduce the risk of the introduction of an introduced marine species. Section 7.9 details how the requirements applicable to the activity will be met.	Certain sections of International Convention for The Prevention of Pollution from Ships (MARPOL) International Convention for the Safety of Life at Sea 1974 Convention on the International Regulations for Preventing Collisions at Sea (COLREG) 1972	DAFF
National Light Pollution Guidelines for Wildlife (CoA 2023)	The Guidelines outline the process to be followed where there is the potential for artificial lighting to affect wildlife. **Application to activity**: Applying the recommendations within this document and implementing effective controls can reduce the impact of light to sensitive receptors. Section 7.2 details how the requirements applicable to the activity will be met.	-	DCCEEW
National Strategy for Reducing Vessel Strike on Cetaceans and other Marine	The overarching goal of the strategy is to provide guidance on understanding and reducing the risk of vessel collisions and the impacts they may have on marine megafauna.	-	DCCEEW

Requirements	Scope	Related International Conventions	Administering Authority
Megafauna (CoA 2017a)	**Application to activity**: Applying the recommendations within this document and implementing effective controls can reduce the risk of the vessel collisions with megafauna. Section 7.10 details how the requirements applicable to the activity will be met.		
Native Title Act 1993 Native Title Legislation Amendment Act 2021	The main objects of this Act are: (a) to provide for the recognition and protection of native title; and (b) to establish ways in which future dealings affecting native title may proceed and to set standards for those dealings; and (c) to establish a mechanism for determining claims to native title; and (d) to provide for, or permit, the validation of past acts, and intermediate period acts, invalidated because of the existence of native title. **Application to activity**: Native Title or Indigenous Land Use Agreements may be present within the Operational and Planning Areas as detailed in Section 6.6.	-	Attorney-General's Department
Navigation Act 2012	This Act regulates ship-related activities and invokes certain requirements of the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) relating to equipment and construction of ships. Several Marine Orders (MO) are enacted under this Act relating to offshore petroleum activities, including: MO 21: Safety and emergency arrangements. MO 30: Prevention of collisions. MO 31: SOLAS and non-SOLAS certification. **Application to activity**: The relevant vessels (according to class) will adhere to the relevant MO with regard to navigation and preventing collisions in Commonwealth waters. Section 7 details how the requirements applicable to the activity will be met.	Certain sections of MARPOL International Convention for the Safety of Life at Sea 1974 (SOLAS) Convention on the International Regulations for Preventing Collisions at Sea 1972 (COLREG)	AMSA
Offshore Petroleum and Greenhouse Gas	The Act addresses all licensing, health, safety, environmental and royalty issues for offshore petroleum exploration and development operations extending beyond the three-nautical mile limit.	-	NOPSEMA

Requirements	Scope	Related International Conventions	Administering Authority
Storage Act 2006 (OPGGS Act) Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023 (OPGGS(E)R)	Part 4 of the OPGGS(E)R specifies that an EP must be prepared for any petroleum activity and that activities are undertaken in an ecologically sustainable manner and in accordance with an accepted EP. **Application to activity**: The OPGGS Act provides the regulatory framework for all offshore petroleum exploration and production activities in Commonwealth waters, to ensure that these activities are carried out: Consistent with the principles of ecologically sustainable development as set out in section 3A of the EPBC Act. So that environmental impacts and risks of the activity are reduced to ALARP. So that environmental impacts and risks of the activity are of an acceptable level. Demonstration that the activity will be undertaken in line with the principles of ecologically sustainable development, and that impacts and risks resulting from these activities are ALARP and acceptable is provided in Section 7.		
Protection of the Sea (Prevention of Pollution from Ships) Act 1983	This Act regulates Australian regulated vessels with respect to ship-related operational activities and invokes certain requirements of the MARPOL Convention relating to discharge of noxious liquid substances, sewage, garbage, air pollution etc. **Application to activity**: All ships involved in petroleum activities in Australian waters are required to abide to the requirements under this Act. Several MOs are enacted under this Act relating to offshore petroleum activities, including: MO 91: Marine Pollution Prevention – Oil. MO 93: Marine Pollution Prevention – Noxious Liquid Substances. MO 94: Marine Pollution Prevention – Packaged Harmful Substances. MO 95: Marine Pollution Prevention – Garbage. MO 96: Marine Pollution Prevention – Sewage. MO 97: Marine Pollution Prevention – Air Pollution. Section 7 details how the requirements applicable to the activity will be met.	Various parts of MARPOL	AMSA

Requirements	Scope	Related International Conventions	Administering Authority
Protection of the Sea (Harmful Antifouling Systems) Act 2006	Under this Act, it is an offence for a person to engage in negligent conduct that results in a harmful anti-fouling compound being applied to or present on a ship. The Act also provides that Australian ships must hold 'anti-fouling certificates', provided they meet certain criteria. **Application to activity**: All ships involved in offshore petroleum activities in Australian waters are required to abide to the requirements under this Act. The MO 98: Marine Pollution Prevention – Anti-fouling Systems is enacted under this Act. Section 7.9 details how the requirements applicable to the activity will be met.	International Convention on the Control of Harmful Anti-fouling Systems on Ships 2001	AMSA
Threat Abatement Plan for the impacts of Marine Debris on Vertebrate Wildlife of Australia's Coasts and Ocean (CoA 2018)	The plans focus on strategic approaches to reduce the impacts of marine debris on vertebrate marine life. **Application to activity**: Section 7.11 details how the requirements applicable to the activity will be met.	-	DCCEEW
Underwater Cultural Heritage Act 2018	Protects the heritage values of shipwrecks, sunken aircraft, and relics (older than 75 years) and other types of underwater cultural heritage including Australia's Aboriginal and Torres Strait Islander Underwater Cultural Heritage in Australian Territorial waters from the low water mark to the outer edge of the continental shelf (excluding the State's internal waterways). The Act allows for protection through the designation of protection zones. Activities / conduct prohibited within each zone will be specified. **Application to activity**: In the event of removal, damage or interference to shipwrecks, sunken aircraft or relics declared to be historic under the legislation, activity is proposed with declared protection zones, or there is the discovery of shipwrecks or relics. Section 6.2.4.1 provides information on known shipwrecks or sunken aircraft in the Operational and Planning Areas.	Agreement between the Netherlands and Australia concerning old Dutch Shipwrecks 1972 UNESCO 2001 Convention on the Protection of the Underwater Cultural Heritage (the UNESCO 2001 Convention).	DCCEEW

Requirements	Scope	Related International Conventions	Administering Authority
	Section 6.6 provides information on First Nations cultural heritage.		
Underwater Cultural Heritage Guidance for Offshore Developments (DoEE 2019)	Provides guidance on how the Underwater Heritage Act must be considered when applying for any State, Territory or Commonwealth planning approval for actions or developments in all coastal and offshore waters. **Application to activity**: Impacts to Underwater Cultural Heritage from the activity have been identified as seabed disturbance and from an oil spill and associated oil spill response activities. The guidance document has been used to inform those sections.		

5.3 Victorian Requirements

Table 5-3: Victorian Environment Requirements Relevant to Potential Impacts and Risks to State Waters and Lands

Requirements	Scope	Application to Activity	Administering Authority
Aboriginal Heritage Act 2006 Aboriginal Heritage Regulations 2018	The Act acts primarily to provide for the protection of Aboriginal cultural heritage in Victoria. It does this through: • Establishing the Victorian Aboriginal Heritage Council. Council provides a state-wide voice for Aboriginal people and advises the Minister for Aboriginal Affairs on cultural heritage management. • Establishing Registered Aboriginal Parties. This allows Aboriginal groups with connections to country to be involved in cultural heritage decision making. • Establishing the Victorian Aboriginal Heritage Register. The register records details about Aboriginal places, objects, and knowledge. • Cultural Heritage Management Plans (CHMPs) and Cultural Heritage Permit processes, to manage activities that may impact Aboriginal cultural heritage. • Providing sanctions and penalties to prevent harm to Aboriginal cultural heritage. • Powers for Authorised Officers and Aboriginal Heritage Officers, and increased fees and charges for breaches of the Act. The Regulations) give effect to the Act. The Regulations prescribe standards, set out the circumstances in which a CHMP should be prepared and set fees and charges.	There is the potential for aboriginal heritage and Registered Aboriginal Parties within the Operational and Planning Areas. Section 6.6 identifies aboriginal heritage sites and Registered Aboriginal Parties within the Operational and Planning Areas.	First Peoples State Relations
Environment Protection Act 2017 and Environmental Protection Regulations 2021	This is the key Victorian legislation which controls discharges and emissions (air, water) to the environment within Victoria (including state and territorial waters). It gives the Environment Protection Authority (EPA) powers to licence premises discharges to the marine environment, control marine discharges and to undertake prosecutions. Provides for the maintenance and, where necessary, restoration of appropriate environmental quality.	Oil pollution management in Victorian State waters. Discharge of domestic ballast water from emergency response vessels	Environmental Protection Authority Victoria

Requirements	Scope	Application to Activity	Administering Authority
	The State Environment Protection Policy (Waters of Victoria) designates: • spill response responsibilities by Victorian Authorities to be undertaken in the event of spills (DoTP) with EPA enforcement consistent with the *Environment Protection Act 1970* and the *Pollution of Waters by Oil & Noxious Substances Act 1986*. • requires vessels not to discharge to surface waters sewage, oil, garbage, sediment, litter or other wastes which pose an environmental risk to surface water beneficial uses. To protect Victorian State waters from marine pests introduced via domestic ballast water, ballast water management arrangements applying to all ships in State and territorial waters must be observed as per the *Environment Protection (Ships' Ballast Water) Regulations 2006, Waste Management Policy (Ships' Ballast Water)* and the *Protocol for Environmental Management*. High risk domestic ballast water (ballast water which leachates from an Australian port or within the territorial sea of Australia (to 12 nm)), regardless of the source, must not be discharged into Victorian State waters. Ship masters must undertake a ballast water risk assessment on a voyage by voyage basis to assess risk level, provide accurate and comprehensive information to the EPA on the status and risk of ballast water contained on their ships (i.e. domestic/international), and to manage domestic ballast water discharges with EPA written approval.	into Victorian State waters must comply with these requirements. Vessel discharges during spill response are managed as detailed in Section 7.7..	
Emergency Management Act 2013	Provides for the establishment of governance arrangements for emergency management in Victoria, including the Office of the Emergency Management Commissioner and an Inspector-General for Emergency Management. Provides for integrated and comprehensive prevention, response, and recovery planning, involving preparedness, operational co-ordination and community participation, in relation to all hazards. These arrangements are outlined in the Emergency Management Manual Victoria.	Emergency response structure for managing emergency incidents within Victorian State waters. Emergency management structure will be triggered in the event of a spill impacting or potentially impacting State waters. See OPEP.	Department of Justice and Community Safety (Emergency Management Commissioner, Emergency Management Victoria)

Requirements	Scope	Application to Activity	Administering Authority
Fisheries Act 1995 (and Regulations 2019)	Provides legislative framework for the regulation, management and conservation of Victorian fisheries including aquatic habitats.	Victorian commercial and recreational fishing occur within the Operational and Planning Areas as described in Section 6.5.13. Impacts and risks to commercial and recreational fishing are assessed in Section 7.	Victorian Fishing Authority (VFA)
Flora and Fauna Guarantee Act (FFG Act) 1988 (and Regulations 2020)	The purpose of this Act is to protect rare and threatened species; and enable and promote the conservation of Victoria's native flora and fauna and to provide for a choice of procedures that can be used for the conservation, management or control of flora and fauna and the management of potentially threatening processes. Where a species has been listed as threatened an Action statement is prepared setting out the actions that have or need to be taken to conserve and manage the species and community.	Triggered if an incident results in the injury or death of a FFG Act listed species (e.g. collision with a whale). See incident reporting requirements in Section 8.3.1.	Department of Energy, Environment and Climate Action (DEECA)
Heritage Act 2017	The purpose of the Act is to provide for the protection and conservation of historic places, objects, shipwrecks and archaeological sites in state areas and waters (complementary legislation to Commonwealth legislation). Part 4 (Underwater cultural heritage) of the Act is focused on historic shipwrecks, which are defined as the remains of all ships that have been situated in Victorian State waters for 75 years or more. The Act addresses, among other things, the registration of wrecks, establishment of protected zones, and the prohibition of certain activities in relation to historic shipwrecks.	Section 6.2.5 identifies maritime heritage in Commonwealth and State waters. Act may be triggered in the event of impacts to a known or previously un-located shipwreck whilst undertaking emergency response activities. Incident reporting requirements in Section 8.3.1 details reporting to Commonwealth in first instance.	Heritage Victoria

Requirements	Scope	Application to Activity	Administering Authority
Marine Safety Act 2010 (and Regulations 2023)	Act provides for safe marine operations in Victoria, including imposing safety duties on owners, managers and designers of vessels, marine infrastructure, and marine safety equipment; marine safety workers, masters and passengers on vessels; regulation and management of vessel use and navigation in Victorian State waters; and enforcement provisions of Police Officers and the Victorian Director of Transport Safety. This Act reflects the requirements of international conventions - *Convention on the International Regulations for Preventing Collisions at Sea* and *International Convention for the Safety of Life at Sea*. The Act also defines marine incidents and the reporting of such incidents to the Victorian Director of Transport Safety.	Applies to vessel masters, owners, crew operating vessels in Victorian State waters whilst undertaking emergency response activities. Vessel safe operations during the activity and/or spill response are managed as detailed in Section 7.	Safe Transport Victoria
National Parks Act 1975	Establishes a framework for the protection and management of national parks in Australia. It provides for the conservation of natural and cultural resources, the provision of recreational opportunities, and the management of park use.	Triggered in the event of a spill impacting or potentially impacting marine or coastal park. Reporting requirements in the event of a spill impacting or potentially impacting State waters are detailed in the OPEP.	DEECA
Pollution of Waters by Oil and Noxious Substances Act 1986 (POWBONS) (and Regulations 2022)	The purpose of the *Pollution of Waters by Oils and Noxious Substances Act 1986* (POWBONS) is to protect the sea and other waters from pollution by oil and noxious substances. This Act also implements the MARPOL Convention (the International Convention for the Prevention of Pollution from Ships 1973) in Victorian State waters. Requires mandatory reporting of marine pollution incidents. Act restricts within Victorian State waters the discharge of treated oily bilge water according to vessel classification (> 400 tonnes); discharge of cargo substances or mixtures; prohibition of garbage disposal and packaged harmful substances; restrictions on the discharge of sewage; regulator reporting requirements for incidents; ship construction certificates and survey requirements.	Triggered in the event of a spill impacting or potentially impacting State waters. Reporting requirements in the event of a spill impacting or potentially impacting State waters are detailed in the OPEP.	Jointly administered by DEECA and EPA

Requirements	Scope	Application to Activity	Administering Authority
Traditional Owner Settlement Act 2010	The purposes of this Act are to advance reconciliation and promote good relations between the State and traditional owners and to recognise traditional owner groups based on their traditional and cultural associations to certain land in Victoria.	There is the potential for aboriginal heritage and Registered Aboriginal Parties within the Operational and Planning Areas. Section 6.6 identifies aboriginal heritage sites and Registered Aboriginal Parties within the Operational and Planning Areas.	Department of Justice and Community Safety
Wildlife Act 1975 (& Regulations 2013)	The purpose of this Act is to promote the protection and conservation of wildlife. Prevents wildlife from becoming extinct and prohibits and regulates persons authorised to engage in activities relating to wildlife (including incidents). The *Wildlife (Marine Mammal) Regulations 2009* prescribe minimum distances to whales and seals/seal colonies, restrictions on feeding/touching and restriction of noise within a caution zone of a marine mammal (dolphins (150 m), whales (300 m) and seals (50 m).	Applies where vessels are within State waters responding to a spill event. Prescribed minimum proximity distances to whales, dolphins and seals will be maintained if vessel undertaking spill response in Victorian waters. Triggered if an incident results in the injury or death of whales, dolphins, or seals. See incident reporting requirements in Section 8.3.1.	DEECA

5.4 Tasmanian Requirements

Table 5-4: Tasmanian Environment Requirements Relevant to Potential Impacts to State Waters and Lands

Requirements	Scope	Application to Activity	Administering Authority
Aboriginal Heritage Act 1975	The Act is the primary legislation for the protection of Aboriginal cultural heritage in Tasmania.	There is the potential for aboriginal heritage and Registered Aboriginal Parties within the Planning Areas. Section 6.6 identifies aboriginal heritage sites any Registered Aboriginal Parties within the Planning Areas.	Department of Premier and Cabinet
Aboriginal Land Act 1995	An Act to promote reconciliation with the Tasmanian Aboriginal community by granting to Aboriginal people certain parcels of land of historic or cultural significance.	There is the potential for aboriginal heritage and Registered Aboriginal Parties within the Planning Areas. Section 6.6 identifies aboriginal heritage sites and Registered Aboriginal Parties within the Planning Areas.	Department of Premier and Cabinet
Emergency Management Act 2006	Provides for the protection of life, property and the environment in the event of an emergency, to establish emergency management arrangements, to provide for certain rescue and retrieval operation. Establishes that the EPA is the designated jurisdictional authority for maritime environmental emergencies in Tasmania, specifically oil pollution and noxious substance pollution events.	The Director, EPA is the Tasmanian Marine Pollution Controller and has powers relating to pollution events under Marine-related Incidents (MARPOL Implementation) Act 2020. See OPEP.	Department of Police, Fire and Emergency Management

Requirements	Scope	Application to Activity	Administering Authority
Environmental Management and Pollution Control Act 1994 (EMPCA) & Regulations	EMPCA is the primary environment protection and pollution control legislation in Tasmania. It is a performance-based style of legislation, with the fundamental basis being the prevention, reduction and remediation of environmental harm. The clear focus of the Act is on preventing environmental harm from pollution and waste. Relevant regulations under the EMPCA include: • Environmental Management and Pollution Control (General) Regulations 2017 • Environmental Management and Pollution Control (Waste Management) Regulations 2010 The EPA Division Compliance Policy provides the Director of the EPA powers of compliance.	Defines the EPA's jurisdiction during a spill event. Prescribes the fee structure to waste events and environmental protection notices. Regulates the management and control of controlled wastes. See OPEP	Environmental Protection Authority (EPA) Tasmania
Historic Cultural Heritage Act 1995	The act was developed to ensure the historic places that are of importance to the whole of Tasmania are recognised, protected, and managed effectively as part of the Resource Management and Planning System.	Section 6.2.5 identifies Martine heritage in Commonwealth and State waters. Act may be triggered in the event of impacts to a known or previously un-located historical items such as shipwrecks whilst undertaking emergency response activities. Incident reporting requirements in Section 8.3.1 details reporting to Commonwealth in first instance.	Heritage Tasmania
Living Marine Resources Management Act 1995	An Act to promote the sustainable management of living marine resources, to provide for management plans relating to fish resources, to protect marine habitats.	Tasmanian commercial fishing occur within the Operational and Planning Areas as described in Section 6.5.12. Impacts and risks to commercial and recreational fishing are assessed in Section 7.	Fishing Tasmania

Requirements	Scope	Application to Activity	Administering Authority
Marine-related Incidents (MARPOL Implementation) Act 2020	Pollution of the sea in Tasmanian State waters may be regulated by general pollution laws such as the EMPCA (see above), but the Marine-related Incidents (MARPOL Implementation) Act 2020 deals specifically with discharges of oil and other pollutants from ships. It gives effect in Tasmania to the MARPOL international convention on marine pollution.	Gives effect to MARPOL in Tasmanian waters. Vessel discharges during the activity and/or spill response are managed as detailed in Section 7.7.	EPA Tasmania
National Parks and Reserves Management Act 2002	The act provides for the management of parks and reserves based on management objectives of each class of reserve, declaration, and management of Marine Protected Areas (marine reserves).	Marine and terrestrial protected areas were identified within the Planning Areas (Section 6.2.10 and 6.2.11).	Tasmania Parks and Wildlife Service
Nature Conservation Act 2002	An Act to make provision with respect to the conservation and protection of the fauna, flora and geological diversity of the State, to provide for the declaration of national parks and other reserved land and for related purposes.	Marine and terrestrial protected areas were identified within the Planning Area (Section 6.2.10 and 6.2.11).	Tasmania Parks and Wildlife Service

5.5 New South Wales Requirements

Table 5-5: NSW Environment Requirements Relevant to Potential Impacts to State Waters and Lands

Requirements	Scope	Application to Activity	Administering Authority
Aboriginal Land Rights Act 1983	An Act to make provisions with respect to the land rights of Aboriginal persons, including provisions for or with respect to the constitution of Aboriginal Land Councils, the vesting of land in those Councils, the acquisition of land by or for those Councils and the allocations of funds to and by those Councils; to amend certain other Acts; and to make provisions for certain other purposes.	There is the potential for aboriginal heritage and Registered Aboriginal Land Councils within the Planning Areas. Section 6.6 identifies aboriginal heritage sites any Aboriginal Land Councils within the Planning Areas.	
Biosecurity Act 2015 Biosecurity Regulation 2017	Provides for the prevention, elimination, minimisation and management of biosecurity risks; and for other purposes.	Applies where oil spill response vessels may pose biosecurity risk to NSW. Section 7.9 details how the requirements applicable to the activity will be met.	NSW Department of Primary Industries
Fisheries Management Act 1994	Act is responsible for managing NSW fisheries to conserve, develop and share the fishery resources of the State for the benefit of present and future generations	NSW commercial and recreational fishing occur within the Planning Areas as described in Section 6.5. Impacts and risks to commercial and recreational fishing are assessed in Section 7.5.	NSW Department of Primary Industries

Requirements	Scope	Application to Activity	Administering Authority
Heritage Act 1977	Act provides for the identification, registration and interim protection of items of State heritage significance (including shipwrecks within state waters) in NSW.	Applies where an oil spill or oil spill response activities may pose a risk to items of State heritage significance. Section 6.2.5 identifies Martine heritage in Commonwealth and State waters. Incident reporting requirements in Section 8.3.1 details reporting to Commonwealth in first instance.	Heritage Council of NSW
Marine Estate Management Act 2014	To provide for the management of the marine estate of New South Wales consistent with the principles of ecologically sustainable development	Applies where an oil spill or oil spill response activities may pose a risk to NSW marine parks. Section 6.2.13 identifies NSW marine parks that may be affected by a spill.	NSW Department of Primary Industries
Marine Pollution Act 2012	This Act is the NSW state legislation giving effect to the requirements of MARPOL 73/78 within state waters. The Act provides the power to respond to oil and chemicals listed within MARPOL.	Applies to oil spill response in NSW waters. Vessel discharges during the activity and/or spill response are managed as detailed in Section 7.7. Provides the portfolio Minister with powers of intervention in regard to the detention or direction of commercial and trading vessels and for preventing, combating, and cleaning up of oil and chemical spills in State waters. See OPEP.	Transport for NSW

Requirements	Scope	Application to Activity	Administering Authority
National Parks and Wildlife Act 1974	This Act provides for the care, control and management of all national parks, historic sites, nature reserves, conservation reserves, Aboriginal areas and game reserves, and the protection and care of native flora and fauna, and Aboriginal places and objects.	Applies where oil spill poses a risk to NSW National parks, historic sites, nature reserves, conservation reserves, Aboriginal areas and game reserves, and the protection and care of native flora and fauna protected under the Act. Relevant NSW environmental and social receptors that maybe affected by an oil spill have been identified in Section 6 and assessed in Section 7.12.	NSW National Parks and Wildlife Service (NPWS)
Protection of the Environment Operations Act 1997	The object of the Act is to achieve the protection, restoration, and enhancement of the quality of the NSW environment. T	Applies where oil spill poses a risk to NSW waters or lands. See OPEP.	NSW Environmental Protection Authority

6 Description of the Environment

This section describes the existing environment including details of particular relevant values and sensitivities within the Planning Area. The Planning Area is used as the spatial boundary for the describing the existing environment as this is the area that may be potentially exposed to hydrocarbons at the low hydrocarbon exposure thresholds described in NOPSEMA Bulletin #1 (NOPSEMA 2019). Figure 6-1 and Table 6-1 detail the Planning Area.

Within the Planning Area there is the:

- Operational Area where the Drilling Program will be undertaken as described in Section 3. Figure 6-1 and Table 6-1 detail the Operational Area.
- The environment that may be affected (EMBA) by each impact and risk. This is detailed in the impact and risk sections and refers to this section where required.

Table 6-1: Planning and Operational Areas Description

	Areas	Description
Otway	Operational Area	The Drilling Program will be undertaken in the Otway Basin within the Otway Operational Area as described in Section 3.1. The EPBC Protected Matters Report for the Otway Operational Area is provided in E. 1 .
	Planning Area	The Otway Planning Area is based on a combination of the diesel and condensate loss of containment planning areas that has been developed based on the spill modelling to the low thresholds as detailed in Section 7.12.4. The EPBC Protected Matters Report for the Otway Planning Area is in Appendix E. 2.
Bass	Operational Area	The Drilling Program will be undertaken in the Bass Basin within the Bass Operational Area as described in Section 3.1. The EPBC Protected Matters Report for the Bass Operational Area is provided in Appendix E. 1.
	Planning Area	The Bass Planning Area is based on a combination of the diesel and condensate loss of containment planning areas that has been developed based on the spill modelling to the low thresholds as detailed in Section 7.12.4. The EPBC Protected Matters Report for the Bass Planning Area is in Appendix E. 2.

6.1 Regulatory Context

The OPGGS(E)R define 'environment' as the ecosystems and their constituent parts, natural and physical resources, qualities and characteristics of areas, the heritage value of places and includes the social, economic, and cultural features of those matters. In accordance with the Regulations, this document describes the physical, ecological, and social components of the environment.

Under the OPGGS(E)R, the EP must describe the existing environment that may be affected by the activity, including details of the particular values and sensitivities (if any) within that environment.

Identified values and sensitivities must include, but are not necessarily limited to, the matters protected under Part 3 of the EPBC Act.

A greater level of detail is provided for those particular values and sensitivities as defined by the OPGGS(E)R which states that particular relevant values and sensitivities may include any of the following:

a. the world heritage values of a declared World Heritage property within the meaning of the EPBC Act;

b. the national heritage values of a National Heritage place within the meaning of that Act;

c. the ecological character of a declared Ramsar wetland within the meaning of that Act;

d. the presence of a listed Threatened species or listed Threatened Ecological Community within the meaning of that Act;

e. the presence of a listed Migratory species within the meaning of that Act;

f. any values and sensitivities that exist in, or in relation to, part or all of:

   i) Commonwealth marine area within the meaning of that Act; or

   ii) Commonwealth land within the meaning of that Act.

With regards to the OPGGS(E)R, more detail has been provided where:

- Species listed as threatened or migratory under the EPBC Act and known or likely to occur in the Operational Areas or Planning Areas. Known and likely occurrence was determined from the PMST Report.
- Species have a biologically important area (BIA). This was determined from the National Conservation Values Atlas (NCVA).
- Species are biologically important behaviour such as breeding, foraging, resting or migration (DCCEEW 2023). This was determined from the PMST Report.

Similarly, more detail has been provided in Section 6.2.15 for Key Ecological Features (KEFs) as they are considered as conservation values of the Commonwealth marine area; and in Section 6.2.2 for Australian Marine Parks (AMPs) as they are enacted under the EPBC Act.

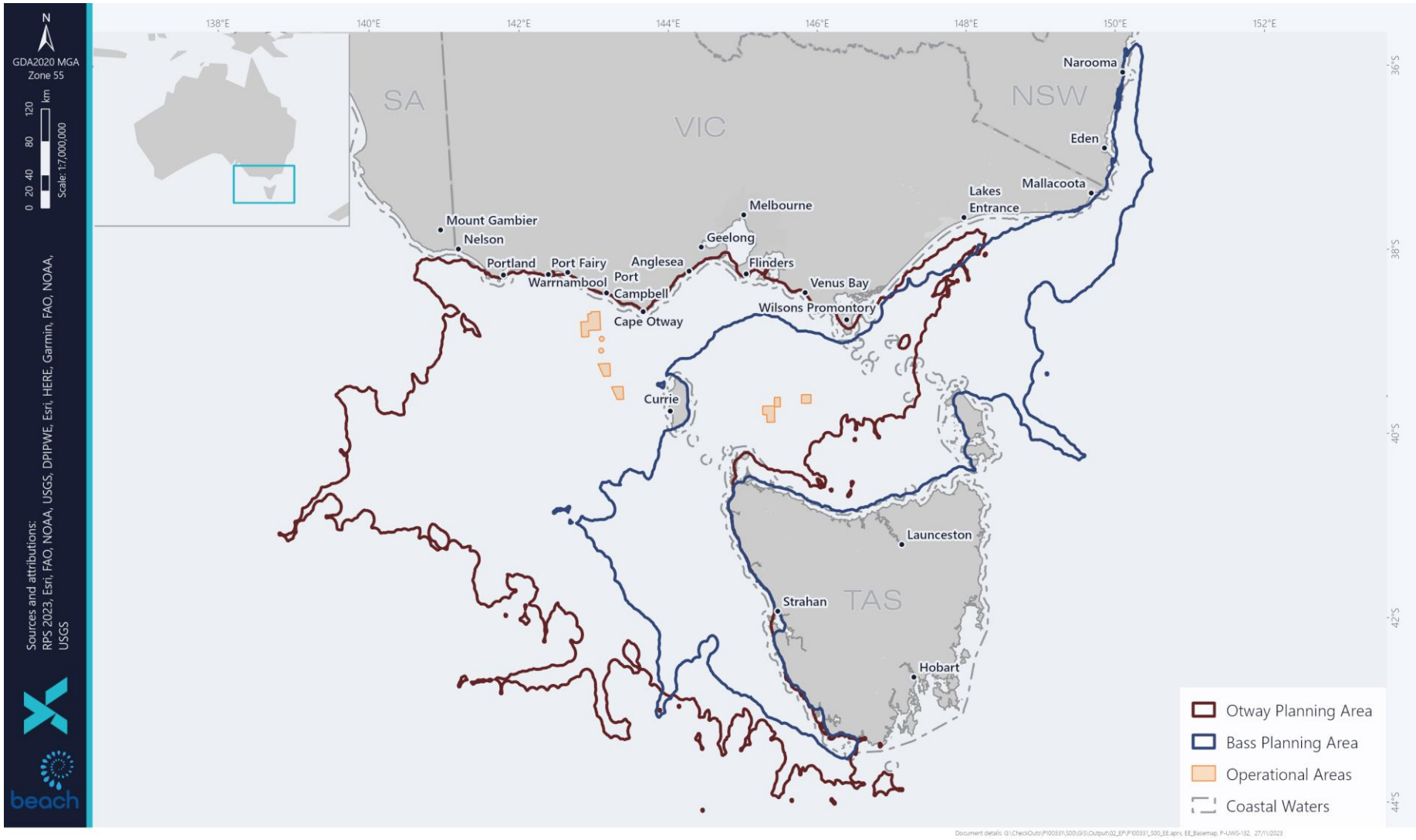


Figure 6-1: Drilling Program Planning and Operational Areas

6.2 Conservation Values and Sensitivities

The following section details the protected areas, heritage areas and key ecological features identified within the Operational and Planning Areas identified from EPBC Protected Matters Search Tool (PMST) Reports.

6.2.1 World Heritage Properties

The PMST Reports (Appendix E) identified one World Heritage Place, the Tasmanian Wilderness, within the Otway and Bass Planning Areas (Figure 6-3).

6.2.1.1 Tasmanian Wilderness

The Tasmanian Wilderness is one the world's largest temperate wilderness areas. Listed in 1982, it is a precious cultural landscape for Tasmanian Aboriginal people, who lived there for at least 35,000 years (DCCEEW 2021a). The Tasmanian Wilderness is an outstanding example representing major stages of the earth's evolutionary history. The Tasmanian Wilderness has outstanding examples representing significant ongoing geological processes and ongoing ecological and biological processes in the evolution and development of terrestrial, fresh water and coastal ecosystems and communities.

The landscape of the Tasmanian Wilderness has exceptional natural beauty and aesthetic importance and contains superlative natural phenomena including rare fauna and flora. The ecosystems of the Tasmanian Wilderness contain important and significant natural habitats where threatened species of animals and plants of outstanding universal value from the point of view of science and conservation still survive including habitats important for endemic plant and animal taxa and taxa of conservation significance (DCCEEW 2021a).

The Tasmanian Wilderness bears a unique and exceptional testimony to an ancient, ice age society, represented by Pleistocene archaeological sites that are unique, of great antiquity and exceptional in nature, demonstrating the sequence of human occupation at high southern latitudes during the last ice age (DCCEEW 2021a).

The Tasmanian Wilderness provides outstanding examples of a type of landscape which illustrates a significant stage in human history. The world heritage values include archaeological sites which provide important examples of the hunting and gathering way of life, showing how people practised this way of life over long time periods, during often extreme climatic conditions and in contexts where it came under the impact of irreversible socio-cultural and economic change.

The Tasmanian Wilderness World Heritage Area is managed under the Tasmanian Wilderness World Heritage Area Management Plan (DPIPWE 2016a).

6.2.2 Australian Marine Parks

Australian Marine Parks (AMPs) identified in the PMST Reports (Appendix E) are presented in Table 6-2 and Figure 6-2. A total of 9 AMPs overlap the Planning Areas and are described in the following subsections.

Table 6-2 Australian Marine Parks within the Planning Areas

Australian Marine Park	Zone & IUCN Categories	Planning Area	
		Bass	Otway
Apollo	Multiple Use Zone (IUCN VI)	-	✓
Beagle	Multiple Use Zone (IUCN VI)	✓	✓
Boags	Multiple Use Zone (IUCN VI)	✓	✓
East Gippsland	Multiple Use Zone (IUCN VI)	✓	-
Flinders	Marine National Park Zone (IUCN II)	✓	-
Franklin	Multiple Use Zone (IUCN VI)	✓	✓
Huon	Multiple Use Zone (IUCN VI)	-	✓
Nelson	Special Purpose Zone (IUCN VI)	-	✓
Tasman Fracture	Marine National Park Zone (IUCN II)	✓	✓
	Multiple Use Zone (IUCN VI)	✓	✓
Zeehan	Multiple Use Zone (IUCN VI)	-	✓
	Special Purpose Zone (IUCN VI)	✓	✓

The majority of AMPs within the Planning Areas are classified as International Union for Conservation of Nature (IUCN) VI – Multiple Use Zone, in which a wide range of sustainable activities are allowed if they do not significantly impact on benthic (seafloor) habitats or have an unacceptable impact on the values of the area. Allowable activities include commercial fishing, general use, recreational fishing, defence, and emergency response. Some forms of commercial fishing, excluding demersal trawl, Danish seine, gill netting (below 183 m) and scallop dredging, are allowed, provided that the operator has approval from the Director of National Parks and abides by the conditions of that approval.

The Nelson AMP and a section of Zeehan AMP which intersect the Planning Areas are classified as IUCN VI - Special Purpose Zone, which allows for limited mining and low-level extraction of natural resources. Permitted activities are similar to Multiple Use Zones; however, commercial fishing is not permitted.

The southern and eastern reaches of the Planning Areas overlap the Tasman Fracture AMP and Flinders AMP which are classified as IUCN II – Marine National Park Zone. This classification does not allow recreational or commercial fishing. Research and monitoring as well as structures and works are permitted with required authorisation.

The South-east Marine Reserves are managed under the South-east Marine Reserves Management Plan (DNP 2013).

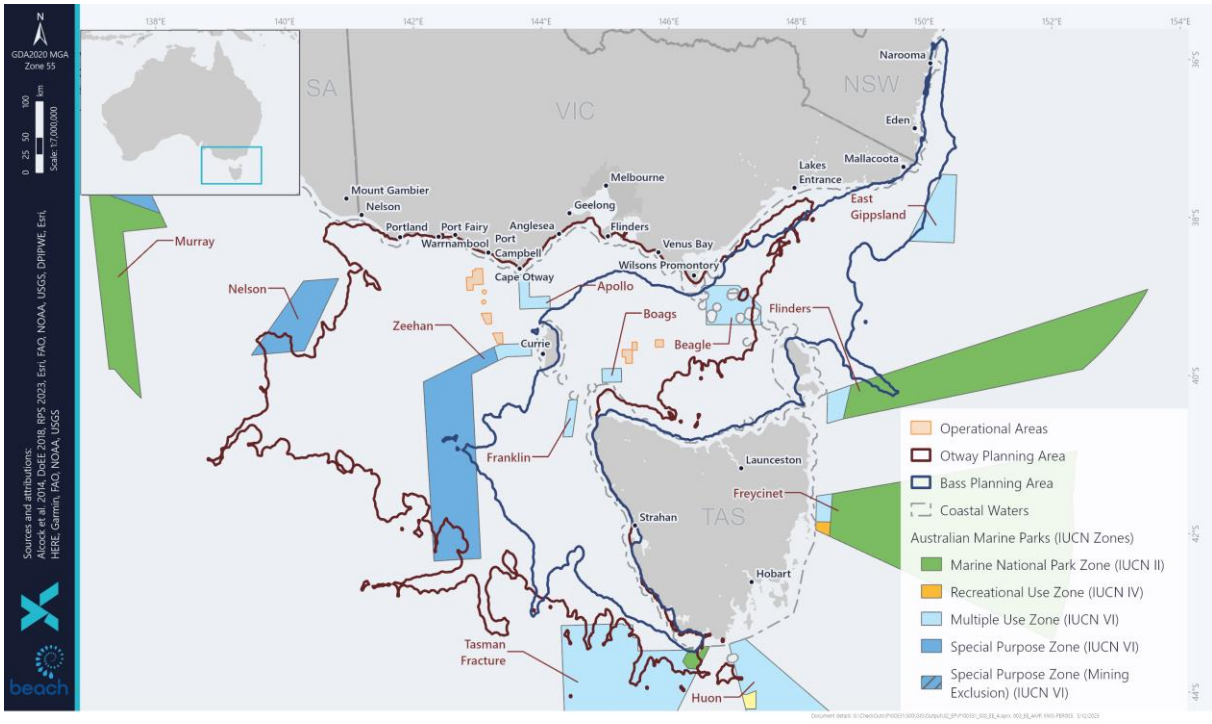


Figure 6-2: Australian Marine Parks within the Planning Areas

6.2.2.1 Apollo

The Apollo AMP is located off Apollo Bay on Victoria's west coast in waters 80 m to 120 m deep on the continental shelf. The reserve comprises 1,184 km^2 of Commonwealth waters (DNP 2013). The reserve encompasses the continental shelf ecosystem of the major biological zone that extends from South Australia to the west of Tasmania. The area includes the Otway Depression, an undersea valley that joins the Bass Basin to the open ocean. Apollo AMP is a relatively shallow reserve with big waves and strong tidal flows; the rough seas provide habitats for fur seals and school sharks (DNP 2013).

The major conservation values of the Apollo AMP are:

- Ecosystems, habitats, and communities associated with the Western Bass Strait Shelf Transition and the Bass Strait Shelf Province and associated with the seafloor features: deep/hole/valley and shelf.
- Important migration area for blue, fin, sei and humpback whales.
- Important foraging area for black-browed and shy albatross, Australasian gannet, short-tailed shearwater, and crested tern.
- Cultural and heritage site - wreck of the MV City of Rayville.

As detailed in the Australian Marine Parks Science Atlas (AMPSA 2023) the Apollo AMP overlaps the following BIAs:

- Antipodean albatross.
- Black-browed albatross.

- Buller's albatross.
- Campbell albatross.
- Indian yellow-nosed albatross.
- Wandering albatross.
- Wedge-tailed shearwater.
- Common diving petrel.
- White-faced storm petrel.
- White shark.
- Pygmy blue whale.
- Southern right whale.

The Apollo AMP does not overlap any KEFs (AMPSA 2023).

6.2.2.2 Beagle

The Beagle AMP is an area in shallow continental shelf depths of about 50 m to 70 m, which extends around south-eastern Australia to Tasmania covering an area of 2,928 km^2 (DNP 2013). The reserve includes the fauna of central Bass Strait; an area known for its high biodiversity. The deeper water habitats are likely to include rocky reefs supporting beds of encrusting, erect and branching sponges, and sediment composed of shell grit with patches of large sponges and sparse sponge habitats.

The reserve includes islands that are important breeding colonies for seabirds and the Australian fur seal, and waters that are important foraging areas for these species. The species-rich waters also attract top predators such as killer whales and great white sharks.

The major conservation values of the Beagle AMP (DNP 2013) are:

- Ecosystems, habitats, and communities associated with the Southeast Shelf Transition and associated with the seafloor features: basin, plateau, shelf, and sill.
- Important migration and resting areas for southern right whales.
- It provides important foraging habitat for the Australian fur-seal, killer whale, great white shark, shy albatross, Australasian gannet, short-tailed shearwater, Pacific and silver gulls, crested tern, common diving petrel, fairy prion, black-faced cormorant, and little penguin.
- Cultural and heritage sites including the wreck of the steamship SS Cambridge and the wreck of the ketch Eliza Davies.

As detailed in the Australian Marine Parks Science Atlas (AMPSA 2023) the Beagle AMP overlaps the following BIAs:

- Black-browed albatross.
- Buller's albatross.
- Campbell albatross.
- Indian yellow-nosed albatross.
- Shy albatross.
- Wandering albatross.
- Little penguin.
- Short-tailed shearwater.
- Common diving petrel.
- White-faced storm petrel.
- White shark.
- Pygmy blue whale.
- Southern right whale.

The Beagle AMP does not overlap any KEFs (AMPSA 2023).

6.2.2.3 Boags

The Boags AMP is a shallow continental ecosystem ranging from 40 m to 80 m depths, covering an area of approximately 537 km^2 (DNP 2013). The marine park contains a high diversity of benthic fauna typical of the central Bass Strait including crustaceans, polychaete worms and molluscs. The pelagic zone is known to support white shark foraging behaviours. The marine park also supports seabird foraging due to the adjacent seabird breeding colonies on the Hunter group of islands.

The major conservation values of the Boags AMP (DNP 2013) are:

- Ecosystems, habitats, and communities associated with the Bass Strait Shelf Province and associated with the seafloor features: plateau and tidal sandwave/sandbank.
- It provides important foraging habitat for the shy albatross, Australasian gannet, short-tailed shearwater, fairy prion, back-faced cormorant, common diving-petrel and little penguin.

As detailed in the Australian Marine Parks Science Atlas (AMPSA 2023) the Boags AMP overlaps the following BIAs:

- Black-browed albatross.
- Buller's albatross.

- Campbell albatross.
- Indian yellow-nosed albatross.
- Shy albatross.
- Wandering albatross.
- Little penguin.
- Short-tailed shearwater.
- Common diving petrel.
- White-faced storm petrel.
- White shark.
- Pygmy blue whale.
- Southern right whale.

The Boags AMP does not overlap any KEFs (AMPSA 2023).

6.2.2.4 East Gippsland

The East Gippsland AMP contains an extensive network of canyons, continental slope and escarpment at water depths from 600 m to more than 4,000 m. The mix of both warm and temperate waters in the reserve create habitat for free-floating aquatic plants or phytoplankton. The East Australian Current combined with complex seasonality in oceanographic patterns creates large eddies of warm water with cooler, nutrient rich waters around the outside of the eddies (DNP 2013). The mixing of these patterns creates conditions for highly productive phytoplankton growth, which support a rich abundance of marine life. Pelagic birds including albatrosses, petrels and shearwaters are known to forage in these waters. Humpback whales are known to migrate through the reserve (DNP 2013).

The major conservation values of the East Gippsland AMP (DNP 2013) are:

- Ecosystems, habitats and communities associated with the Southeast Transition feature: Abyssal plain/deep ocean floor, canyon, escarpment, knoll / abyssal hill and slope.
- Important for biodiversity and productivity from the Bass Cascade and the upwelling east of Eden.
- Important foraging habitat for wandering albatross, black-browed albatross, yellow-nosed albatross, shy albatross, great-winged petrel, wedge-tailed shearwater and cape petrel.
- Important area for the migration of humpback whales.

As detailed in the Australian Marine Parks Science Atlas (AMPSA 2023) the East Gippsland AMP overlaps the following BIAs:

- Antipodean albatross.

- Black-browed albatross.
- Buller's albatross.
- Campbell albatross.
- Indian yellow-nosed albatross.
- Shy albatross.
- Wandering albatross.
- Wedge-tailed shearwater.
- White-faced storm petrel.
- White shark.
- Pygmy blue whale.

The East Gippsland AMP overlaps the Upwelling East of Eden KEF (AMPSA 2023).

6.2.2.5 Flinders

The Flinders AMP is located off the eastern coast of Tasmania. It covers a total area of 27,043 km^2. The Flinders AMP covers a depth range from 40 m to 3,000 m, encompassing the long, steep continental slope off the coast of Tasmania. Marine biodiversity is influenced by the summer incursions of the East Australian Current, and associated eddies. Additionally, a large, relatively undisturbed seamount is located within the park (DNP 2013).

The major conservation values of the Flinders AMP (DNP 2013) are:

- Ecosystems, habitats, and communities associated with sea-floor features: abyssal plain/deep ocean floor, canyons, plateaus, seamounts, the continental shelf and slope.
- Biodiversity and productivity of the East Tasmania subtropical convergence zone.
- Important foraging area for wandering, black-browed, yellow-nosed, and shy albatrosses, northern giant petrel, Gould's petrel, cape petrel, and killer whale.
- Important migration area for the humpback whale.

As detailed in the Australian Marine Parks Science Atlas (AMPSA 2023) the Flinders AMP overlaps the following BIAs:

- Antipodean albatross.
- Black-browed albatross.
- Buller's albatross.

- Campbell albatross.
- Indian yellow-nosed albatross.
- Shy albatross.
- Wandering albatross.
- Black-face cormorant.
- Short-tailed shearwater.
- Common diving petrel.
- White-faced storm petrel.
- White shark.
- Pygmy blue whale.
- Southern right whale.

The Flinders AMP overlaps the Seamounts South and East of Tasmania KEF (AMPSA 2023).

6.2.2.6 Franklin

The Franklin AMP covers an area of 671 km^2 west of the north-western corner of Tasmania and south-east of King Island (DNP 2013). At its northern end, the waters are only 40 m deep, and in much of the reserve the sea floor slopes gently and is covered by fine and coarse sediments. At the southern end of the reserve there is a valley where the water is up to 150 m deep.

The major conservation values for the Franklin AMP (DNP 2013) are:

- Examples of ecosystems, habitats and communities associated with the Tasmanian Shelf Province and the Western Bass Strait Shelf Transition and associated with sea-floor features: shelf, deep/hole/valley, escarpment, and plateau.
- Important foraging area for shy albatross, short-tailed shearwater, Australasian gannet, fairy prion, little penguin, common diving petrel, black-faced cormorant and silver gull.
- Black Pyramid Rock, 6 km north of the AMP supports the largest breeding colony of the Australasian gannet in Tasmania, and one of only eight breeding sites for this species in Australia.
- White sharks also forage in the AMP.

As detailed in the Australian Marine Parks Science Atlas (AMPSA 2023) the Franklin AMP overlaps the following BIAs:

- Antipodean albatross.
- Black-browed albatross.

- Buller's albatross.
- Campbell albatross.
- Indian yellow-nosed albatross.
- Shy albatross.
- Wandering albatross.
- Australasian gannet.
- Little penguin.
- Short-tailed shearwater.
- Common diving petrel.
- White-faced storm petrel.
- White shark.
- Pygmy blue whale.
- Southern right whale.

The Franklin AMP does not overlap any KEFs (AMPSA 2023).

6.2.2.7 Huon

The Huon AMP is located 19 km south-east of Tasmania and comprises a total area of 9,991 km^2 with water depths ranging from 70 m to 3,000 m (DNP 2013). The reserve contains the largest cluster of seamounts in Australian waters which provide a range of depths for a diversity of species. Seamounts are areas of high productivity and play an important role in the transoceanic dispersal of larvae for bottom-dwelling species. The undulating slopes of the seamounts accelerates water currents which expose rocky substrate for many species including corals and sponges and provide a rich food source for filter feeders (DNP 2013). The reserve is also an important foraging area for seabirds including black-browed, Buller's and shy albatrosses, great-winged petrel, short-tailed shearwater and fairy prion. Commercially important fish species such as the blue warehou and ocean perch are known use the reserve as a spawning and nursery area. White sharks and Australian fur seals are also known to utilise the reserve.

The major conservation values of the Huon AMP (DNP 2013) are:

- Ecosystems, habitats and communities associated with the Tasmanian Shelf Province, Tasmania Province and associated with seafloor features: canyon, seamount, pinnacle, saddle, shelf, and terrace.
- Features with high biodiversity and productivity: seamounts south and east of Tasmania.

- Important foraging area for black-browed, Buller's and shy albatrosses, great-winged petrel, short-tailed shearwater and fairy prion, Australian fur seal and killer whale.
- Important migration area for humpback whale.

As detailed in the Australian Marine Parks Science Atlas (AMPSA 2023) the Huon AMP overlaps the following BIAs:

- Antipodean albatross.
- Black-browed albatross.
- Buller's albatross.
- Campbell albatross.
- Indian yellow-nosed albatross.
- Shy albatross.
- Wandering albatross.
- Australasian gannet.
- Short-tailed shearwater.
- Sooty shearwater.
- Common diving petrel.
- Soft-plumaged petrel.
- White shark.
- Pygmy blue whale.
- Southern right whale.

The Huon AMP overlaps the Seamounts South and East of Tasmania KEF (AMPSA 2023).

6.2.2.8 Nelson

The Nelson AMP covers an area of 6,123 km^2 off the coast of South Australia, along the shared maritime border with Victoria (DNP 2013). Due to being beyond the continental shelf, water depths within the park exceed 3,000 m and contains geological features including plateaus, knolls, canyons and the abyssal plain.

The major conservation values of the Nelson AMP (DNP 2013) are:

- Examples of ecosystems, habitats and communities associated with the West Tasmanian Transition and associated with sea-floor features: abyssal plain/deep ocean floor, canyon, knoll/abyssal hill, plateau and slope.
- Important migration area for:
  - Humpback whale.
  - Blue, fin and sei whales (likely migration).

As detailed in the Australian Marine Parks Science Atlas (AMPSA 2023) the Nelson AMP overlaps the following BIAs:

- Antipodean albatross.
- Black-browed albatross.
- Buller's albatross.
- Campbell albatross.
- Indian yellow-nosed albatross.
- Shy albatross.
- Wandering albatross.
- Common diving petrel.
- White shark.

The Huon AMP does not overlap any KEFs (AMPSA 2023).

6.2.2.9 Tasman Fracture

The Tasman Fracture AMP covers an area of 42,501 km^2 in the south-west of Tasmania. (DNP 2013). The AMP extends beyond continental shelf, covering the continental slope and deepwater ecosystems as well as several geological features. Waters surrounding Mewstone, which hosts the largest colony of shy albatrosses, are also protected by the AMP. Water depths vary significantly throughout the AMP, ranging from 60 to 5,559 m. The Planning Area overlaps the Multiple Use Zone (IUCN VI) and National Park Zone (IUCN II). There is an additional Special Purpose Zone to the south of the Planning Area.

The major conservation values for the Tasman Fracture AMP (DNP 2013) are:

- Examples of ecosystems, habitats and communities with the Tasman Province, the Tasmanian Shelf Province and West Tasmania Transition and associated with sea-floor features: abyssal plain/deep ocean floor, basin, canyon, knoll/abyssal hill, pinnacle, plateau, ridge, saddle, shelf, slope, terrace, and trench/trough.
- Important whale migration for humpback whale.

- Important foraging areas for:
  - New Zealand fur-seal.
  - Wandering, black-browed and shy albatrosses; white-chinned petrel; common diving-petrel; short-tailed shearwater; and fairy prion
  - White shark.

As detailed in the Australian Marine Parks Science Atlas (AMPSA 2023) the Tasman Fracture AMP overlaps the following BIAs:

- Antipodean albatross.
- Black-browed albatross.
- Buller's albatross.
- Campbell albatross.
- Indian yellow-nosed albatross.
- Shy albatross.
- Wandering albatross.
- Short-tailed shearwater.
- Sooty shearwater.
- Black-faced cormorant.
- Common diving petrel.
- Soft-plumaged petrel.
- White shark.
- Pygmy blue whale.
- Southern right whale.

The Tasman Fracture AMP overlaps the West Tasmania Canyons and Seamounts South and East of Tasmania KEFs (AMPSA 2023).

6.2.2.10 Zeehan

The Zeehan AMP covers an area of 19,897 km^2 to the west and south-west of King Island in Commonwealth waters surrounding north-western Tasmania (DNP 2013). It covers a broad depth range from the shallow continental shelf depth of 50 m to the abyssal plain which is over 3,000 m deep. The AMP spans the continental shelf, continental slope and deeper water ecosystems of the

major biological zone that extends from South Australia to the west of Tasmania. Four submarine canyons incise the continental slope, extending from the shelf edge to the abyssal plains. A rich community made up of large sponges and other permanently attached or fixed invertebrates is present on the continental shelf, including giant crab (*Pseudocarcinus gigas*). Concentrations of larval blue wahoo (*Seriolella brama*) and ocean perch (*Helicolenus* spp.) demonstrate the role of the area as a nursery ground.

Rocky limestone banks provide important seabed habitats for a variety of commercial fish and crustacean species including the giant crab. The area is also a foraging area for a variety of seabirds such as fairy prion, shy albatross, silver gull, and short-tailed shearwater (DNP 2013).

The major conservation values for the Zeehan AMP (DNP 2013) are:

- Examples of ecosystems, habitats and communities associated with the Tasmania Province, the West Tasmania Transition and the Western Bass Strait Shelf Transition and associated with the seafloor features: abyssal plain/deep ocean floor, canyon, deep/hole/valley, knoll/abyssal hill, shelf, and slope.
- Important migration area for blue and humpback whales.
- Important foraging habitat for black-browed, wandering, and shy albatrosses, and great-winged and cape petrels.

As detailed in the Australian Marine Parks Science Atlas (AMPSA 2023) the Zeehan AMP overlaps the following BIAs:

- Antipodean albatross.
- Black-browed albatross.
- Buller's albatross.
- Campbell albatross.
- Indian yellow-nosed albatross.
- Shy albatross.
- Wandering albatross.
- Short-tailed shearwater.
- Wedge-tailed shearwater.
- Common diving petrel.
- White-face storm petrel.
- White shark.

- Pygmy blue whale.
- Southern right whale.

The Zeehan AMP overlaps the West Tasmania Canyons KEF (AMPSA 2023).

6.2.3 National Heritage Places

National Heritage Places identified within the Planning Areas identified from the PMST Report (Appendix E) are presented in Table 6-3 and Figure 6-3. Listed National Heritage Places which overlap the Planning Areas are described in the subsections below.

Two nominated places, Point Lonsdale Lighthouse Reserve and Environs and Summerland Peninsula overlap the Planning Area but are not yet listed (Table 6-3). Information on the National Heritage Places is sourced from the Australian Heritage Database.

Table 6-3 National Heritage Places within the Planning Areas

National Heritage Places	Class	Status	Coastal Component	Planning Area	
				Bass	Otway
Great Ocean Road and Scenic Environs	Historic	Listed place	✓	-	✓
Point Lonsdale Lighthouse Reserve and Environs	Historic	Nominated place	✓	-	✓
Point Nepean Defence Sites and Quarantine Station Area	Historic	Listed place	✓	-	✓
Quarantine Station and Surrounds (within Point Nepean Site)	Historic	Within listed place	✓	-	✓
Summerland Peninsula	Natural	Nominated place	✓	-	✓
Tasmanian Wilderness	Natural	Listed place	✓	✓	✓
Western Tasmania Aboriginal Cultural Landscape	Indigenous	Listed place	✓	✓	✓

6.2.3.1 Great Ocean Road and Scenic Environs

The Australian Heritage Council found the Great Ocean Road and its scenic environs road from Torquay to Allansford, a journey of 242 km, as a place of outstanding national heritage significance. Constructed by workers, including more than 3,000 returned servicemen, as a memorial to First World War servicemen, the Great Ocean Road is a significant reminder of the participation of Australian servicemen in the First World War, the Australian community's appreciation of their service, and the support provided for the welfare of servicemen and women upon returning to Australia.

The scenic environs include all views from the Great Ocean Road and Great Ocean Walk, including the Twelve Apostles, the Bay of Islands and Bay of Martyrs. The coastline from Lorne to Kennett River is among the world's most dramatic cliff and ocean scenery able to be viewed from a vehicle.

Along the length of the Great Ocean Road, the pullover points, and lookouts beside or nearby the road provide travellers with spectacular views of the coastline, hinterland, and Bass Strait seascape, framed only by cliffs, lighthouses and unencumbered by intrusive built structures. The place is also listed for its; outstanding rocky coastline, dinosaur fossil sites, geomorphological monitoring sites, its association with the pioneering landscape architect Edna Walling, and for the significance of Bells Beach to surfing.

6.2.3.2 Point Nepean Defence Sites and Quarantine Station Area including Quarantine Station and Surrounds

Point Nepean comprises approximately 520 ha at the western end of the Mornington Peninsula, along the southern coast of Port Phillip Bay. The coastline at Point Nepean is rocky with cliffs as well as Pleistocene and Holocene dunes. Ninety species of birds have been recorded at the site.

Point Nepean demonstrates the primary importance of coastal defence as well as Victorian and national quarantine processes. It contains the oldest surviving quarantine accommodation buildings in Australia which was established in 1852 after the discovery of gold which saw 100,000 migrants arriving to the region by sea.

6.2.3.3 Tasmanian Wilderness

The Tasmanian Wilderness Heritage Area comprises approximately 1,383,640 ha (nearly 20% of the land area of Tasmania), which includes 21 parks and reserves as well as privately owned land. It is considered significant for both natural and cultural values. It is one of only three temperate wilderness areas remaining in the southern hemisphere and contains rich flora and fauna biodiversity, much of which is endemic to the region. For further details see Section 6.2.1.1.

6.2.3.4 Western Tasmania Aboriginal Cultural Landscape

The Western Tasmania Aboriginal Cultural Landscape represents the best evidence of an Aboriginal economic adaptation which included the development of a semi-sedentary way of life with people moving seasonally up and down the north-west coast of Tasmania. This way of life began approximately 1,900 years ago and lasted until the 1830s.

Dotted along the wind-swept coastline of the Western Tasmania Cultural Landscape are the remains of numerous hut depressions found in Aboriginal shell middens. These huts and middens are the remnants of an unusual, specialised and more sedentary Aboriginal way of life which was based on the hunting of seals and land mammals, and the gathering of shellfish.

The Western Tasmania Cultural Landscape covers approximately 21,000 ha. Much of the area is remote and uninhabited with its remoteness being a significant factor in the area's relatively low level of resource use since European settlement.

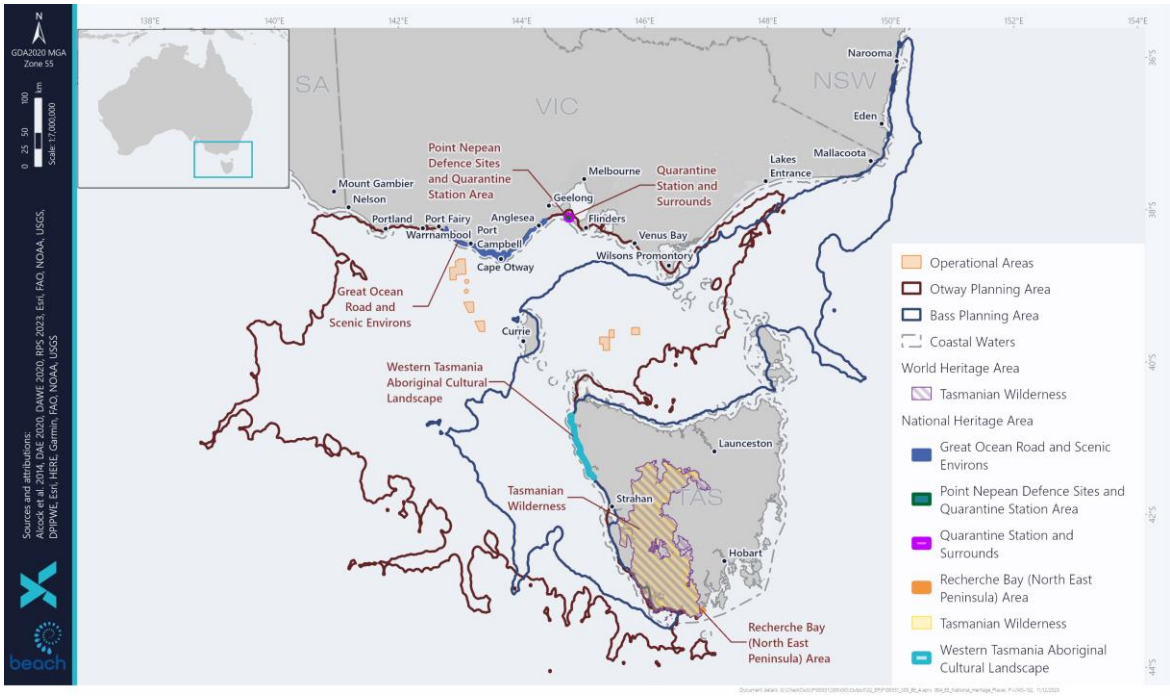


Figure 6-3: World Heritage Properties and National Heritage Places within the Planning Areas

6.2.4 Commonwealth Heritage Places

Commonwealth Heritage Places identified in the PMST Reports (Appendix E) are presented in Table 6-4 and Figure 6-4. Places identified in the PMST Report due to the size of the grids used in the PMST but not actually intersecting the Planning Area are listed in the Table 6-4 with 'X'. Commonwealth Heritage Places which intersect a Planning Area and have a coastal component which may be exposed to hydrocarbons from a spill event are discussed in the subsections below.

Table 6-4 Commonwealth Heritage Places within the Planning Areas

Commonwealth Heritage Places	Heritage Class	Coastal Component	Planning Area	
			Bass	Otway
Cape Sorell Lighthouse	Historic	-	✓	✓
Cape Wickham Lighthouse	Historic	-	X	✓
Fort Queenscliff	Historic	-	-	✓
Gabo Island Lighthouse	Historic	-	✓	-
Goose Island Lighthouse	Historic	-	✓	-
HMAS Cerberus Marine and Coastal Area	Natural	✓	-	✓
Montague Island Lighthouse	Historic	-	✓	-
Sorrento Post Office	Historic	-	-	✓
Swan Island and Naval Waters	Natural	✓	-	✓
Swan Island Defence Precinct	Historic	-	-	✓
Table Cape Lighthouse	Historic	-	X	-
Wilsons Promontory Lighthouse	Historic	-	-	✓

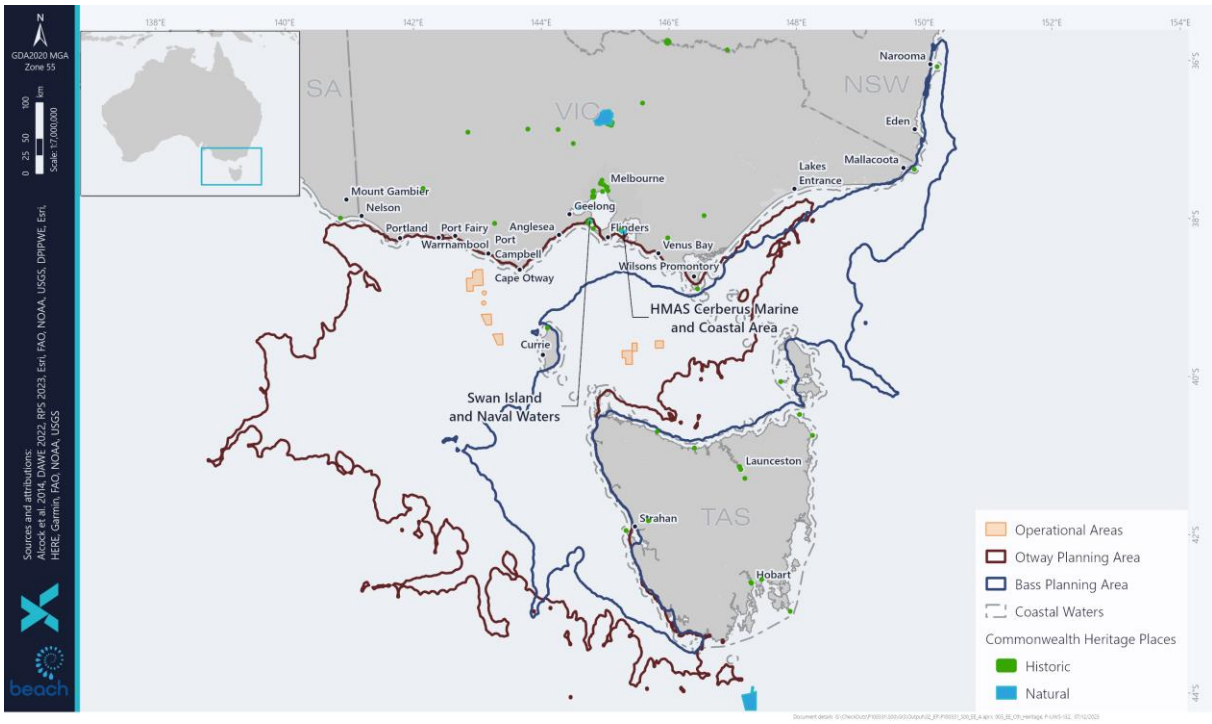


Figure 6-4: Commonwealth Heritage Places within the Planning Areas

6.2.4.1 HMAS Cerberus Marine and Coastal Area

The HMAS Cerberus Marine and Coastal Area comprises 2,400 ha at Sandy Point, one of the largest spit systems on the Victorian coast and thus one of the most dynamic shorelines. It is located along the western shore of the Western Port Ramsar site and shares its significance in providing habitat for

migratory and resident waders and shorebirds, primarily on the intertidal mudflats. The site also hosts a large diversity of invertebrates in its wide range of habitats including tidal channels, tidal currents, tidal mudflats, mangroves, saltmarshes, and sand beaches. The intertidal flats are covered by seagrass *Zostera muelleri* which supports a wide range of crustaceans including amphipods, crabs, shrimps, polychaetes, and many bivalves. The mangroves are known to support crabs, polychaetes, bivalves, pulmonated gastropods, amphipods, and isopods. Marine mammals, including the Australian fur-seal and bottlenose dolphin, are also known to occur in the area. There is likely to be cultural values associated with the site which have not yet been identified or documented.

6.2.4.2 Swan Island and Naval Waters

The Swan Island and Naval Waters heritage site comprises approximately 1,000 ha including the whole of Swan Island as well as its surrounding waters. Swan Island is the largest emergent sand accumulation feature in Port Phillip Bay. The heritage site is regarded as an integral part of Swan Bay, an internationally important wetland which supports at least 46 water bird species. Swan Bay also contains extensive sheltered seagrass meadows which serve as a breeding and nursery area for a diverse array of fish species. Swan Bay is one of four major wintering sites for the orange-bellied parrot, providing abundant food sources in the saltmarshes surrounding Swan Island. There is likely to be cultural values associated with the site which have not yet been identified or documented.

6.2.5 Maritime Archaeological Heritage

Shipwrecks over 75 years old are protected within Commonwealth waters under the *Underwater Cultural Heritage Act 2018* (Cth), in Victorian State waters under the *Victorian Heritage Act 2017* (Vic) and in Tasmanian waters under the *Historic Cultural Heritage Act 1995*. Some historic shipwrecks lie within protected zones of up to 800 m radius, typically when the shipwreck is considered fragile or at particular risk of interference. In Tasmania, the Historic Heritage Section of the Parks and Wildlife Service is the government authority responsible for the management of the State's historic shipwrecks and other maritime heritage sites.

Within the Otway Planning Area the coast from Cape Otway to Port Fairy is known as the 'Shipwreck Coast' because of the large number of shipwrecks present, with most wrecked during the late nineteenth century. The strong waves, rocky reefs and cliffs of the region contributed to the loss of these ships. More than 180 shipwrecks are believed to lie along the Shipwreck Coast (DTP 2023) and well-known wrecks include Loch Ard (1878), Thistle (1837), Children (1839), John Scott (1858) and Schomberg (1855).

The wrecks represent significant archaeological, educational, and recreational (i.e. diving) opportunities for locals, students and tourists (Flagstaff Hill 2015).

There are over 450 historic wrecks (older than 75 years) within the Otway Planning Area and over 200 historic wrecks within the Bass Planning Area (Figure 6-5). The Otway Planning Area contains two historic wrecks with protected zones, the SS Alert and SS Glenelg. The Bass Planning Area contains one historic wreck with a protected zone, the SS Federal (Figure 6-5). SS Glenelg is located within 1.5 km of the Bass Planning Area (Figure 6-5). The Bass Operational Area contains one shipwreck, the SS Albert (Figure 6-5). No wrecks have been recorded within the Otway Operational Areas.

No maritime archaeological heritage was identified in the Beach seabed site assessment for the Otway Gas Development.

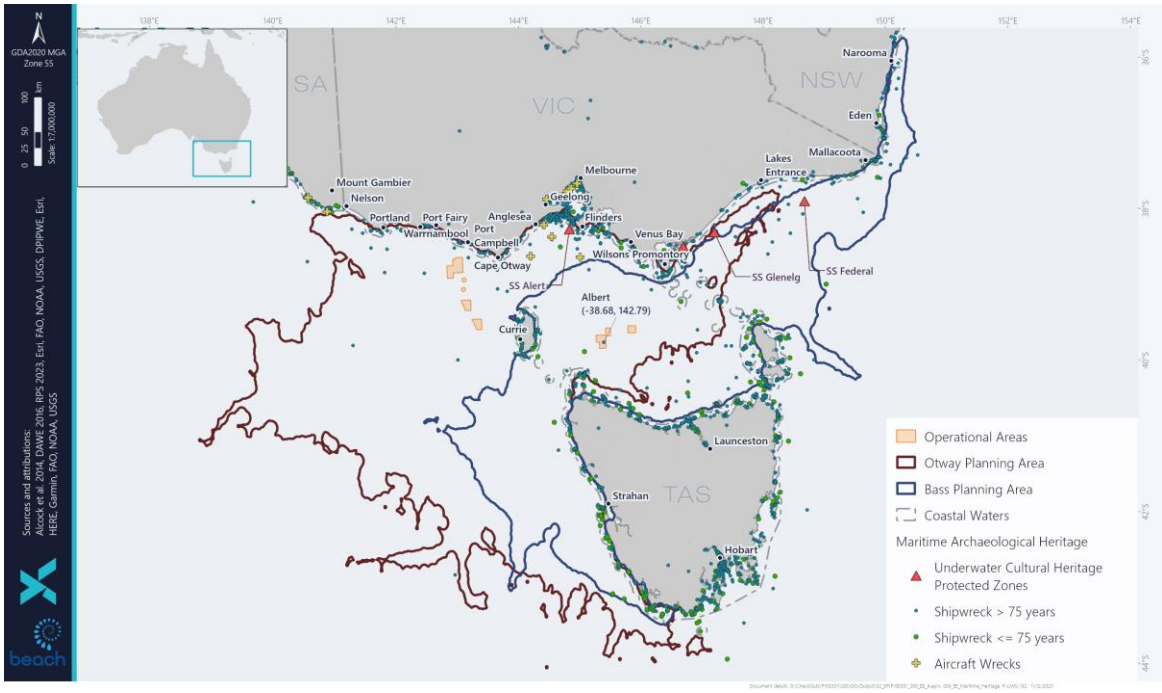


Figure 6-5: Maritime Archaeological Heritage within the Operational and Planning Areas

6.2.6 Wetlands of International Importance

Wetlands of International Importance (Ramsar-listed wetlands) identified in the PMST Reports (Appendix E) are presented in Table 6-5 and Figure 6-6. Wetlands identified in the PMST Report due to the size of the grids used in the PMST but not actually intersecting a Planning Area are listed in the Table with 'X'. Wetlands of International Importance which intersect a Planning Area and have a coastal component which may be exposed to hydrocarbons from a spill event are discussed in the subsections below.

As defined in the OPGGS(E)R, particular relevant values and sensitivities include: the ecological character of a declared Ramsar wetland within the meaning of that Act. The ecological character and values of the overlapping Ramsar sites are described below and are from the Australian Wetlands Database (DCCEEW 2024j).

Table 6-5 Wetlands of International Importance within the Planning Areas

Wetlands of International Importance (Ramsar)	Coastal Component	Planning Area	
		Bass	Otway
Corner Inlet	✓	X	X
Gippsland Lakes	✓	-	X
Glenelg Estuary and Discovery Bay Wetlands	✓	-	✓
Lavinia	✓	✓	✓
Little Waterhouse Lake	-	X	-
Piccaninnie Ponds Karst Wetlands	✓	-	X
Port Phillip Bay (Western Shoreline) and Bellarine Peninsula	✓	-	✓

Western Port	✓	-	✓

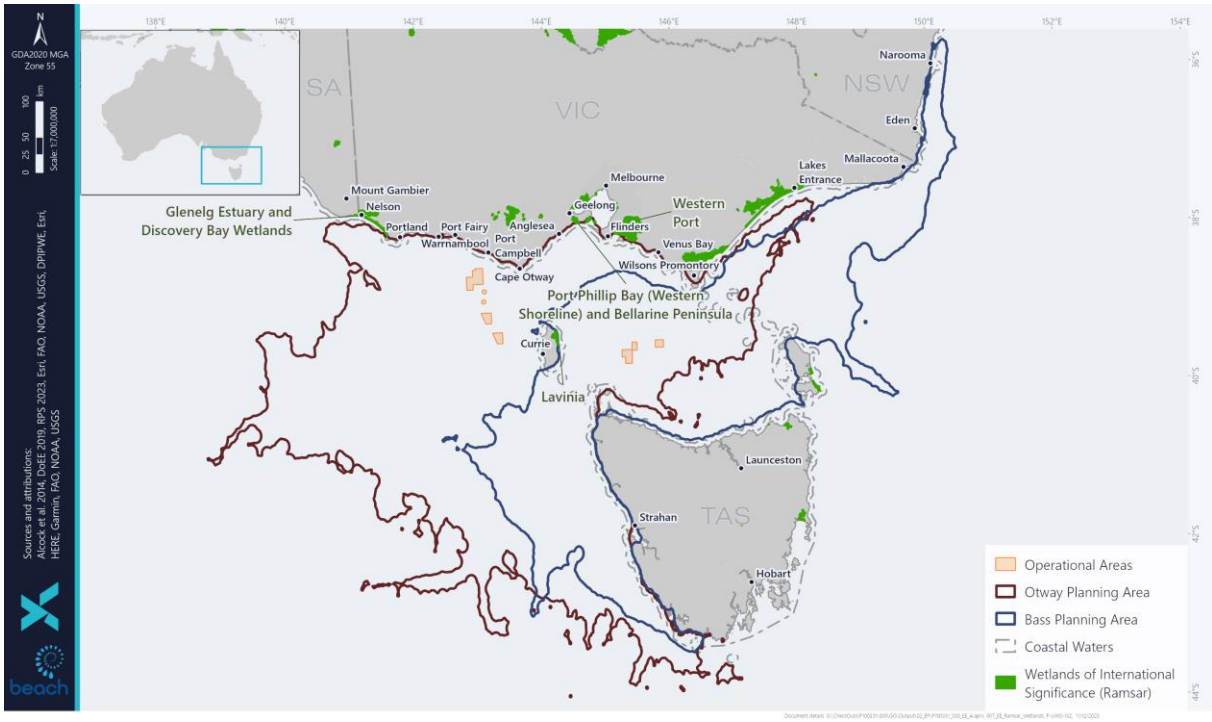


Figure 6-6: Ramsar Wetlands within the Planning Areas

6.2.6.1 Glenelg Estuary and Discovery Bay Wetlands

The Glenelg Estuary and Discovery Bay Wetlands Ramsar site is located in western Victoria, approximately 340 km west of Melbourne along the South Australian border. It is subject to the Glenelg Estuary and Discovery Bay Wetlands Management Plan (DELWP 2017a).

The site comprises approximately 22,289 ha which contain three broad systems of wetlands: freshwater wetlands, the Glenelg Estuary and beach and dune system. The site also contains regionally and internationally rare wetland types, including intact fen peatlands and a humid dune slack system. Several threatened flora and fauna species are supported by the site, including 95 waterbird species and 14 diadromous fish species.

There are 10 critical components, process and services which define the area. Components include hydrology, vegetation type and extent, as well as fish and waterbird diversity and abundance. The stratification process is considered significant in the area. Services include special features (dune slacks), supporting a diversity of wetland types, supporting threatened species, providing physical habitat for waterbirds and ecological connectivity.

The Gunditjmara Indigenous people have a living association with the Ramsar site, which has great cultural significance for them, as it is part of their *Koonang* (sea) and *Bocara Woorrowarook* (river forest) country.

Recreational and tourism activities are popular in the area including recreational fishing, camping, walking, and sightseeing.

6.2.6.2 Lavinia

The Lavinia Ramsar site is located on the north-east coast of King Island, Tasmania. The boundary of the site forms the Lavinia State Reserve, with major wetlands in the reserve including the Sea Elephant River estuary area, Lake Martha Lavinia, Penny's Lagoon, and the Nook Swamps. It is subject to the Lavinia Nature Reserve Management Plan (PWS 2000) (in draft).

The shifting sands of the Sea Elephant River's mouth have caused a large back-up of brackish water in the Ramsar site, creating the saltmarsh which extends up to 5 km inland. The present landscape is the result of several distinct periods of dune formation. The extensive Nook Swamps, which run roughly parallel to the coast, occupy a flat depression between the newer parallel dunes to the east of the site and the older dunes further inland. Water flows into the wetlands from the catchment through surface channels and groundwater and leaves mainly from the bar at the mouth of the Sea Elephant River and seepage through the young dune systems emerging as beach springs.

The Lavinia State Reserve is one of the few largely unaltered areas of the island and contains much of the remaining native vegetation on King Island. There are 10 critical components and processes identified in the Ramsar site: wetland vegetation communities, regional and national rare plant species, regionally rare bird species, Kind Island scrubtit, orange-bellied parrot, water and sea birds, migratory birds, striped marsh frog and the green and gold frog. Benefits provided by the Lavinia Ramsar site include aquaculture (oyster farming), tourism, education, and scientific value.

The vegetation communities include Succulent Saline Herbland, Coastal Grass and Herbfield, Coastal Scrub and King Island *Eucalyptus globulus* Woodland. The freshwater areas of the Nook Swamps are dominated by swamp forest. Nook Swamps and the surrounding wetlands contain extensive peatlands.

The site is an important refuge for a collection of regional and nationally threatened species, including the nationally endangered, orange-bellied parrot. This parrot is heavily dependent upon the samphire plant, which occurs in the saltmarsh, for food during migration. They also roost at night in the trees and scrub surrounding the Sea Elephant River estuary.

Several species of birds which use the reserve are rarely observed on the Tasmanian mainland, including the dusky moorhen, nankeen kestrel, rufous night heron and the golden-headed cisticola.

The Lavinia Ramsar site is also known to have significant Aboriginal sites, particularly around the lagoon system and the coastal beaches (PWS 2000).

The site is currently used for conservation and recreation, including boating, fishing, camping and off-road driving.

There has been considerable damage caused to the saltmarsh community by vehicle disturbance in the Sea Elephant Estuary and the coastal strip (PWS 2000). Vegetation clearance in parts of the catchment upstream as contributed to altered water balance due to less evapotranspiration of rainfall and build-up of the groundwater. There are threats to flora and fauna by invasive weeds and fungus. Although aquaculture plays a role in the Lavinia benefits risk from inputs of nutrients from feeding and occasional opening of the barred estuary for tidal flushing although with farm vehicles disturbance can impact the site.

6.2.6.3 Port Phillip Bay (Western Shoreline) and Bellarine Peninsula

The Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site is located on the western shore of Port Phillip Bay between Melbourne and Geelong and along the Bellarine Peninsula. It is subject to the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site Management Plan (DELWP 2018).

The site comprises 22,897 ha and 6 distinct areas including Point Cooke/Cheetham, Werribee/Avalon, Point Wilson/Limeburner's Bay, Swan Bay, Mud Islands, and the Lake Connewarre complex. These areas contain freshwater wetlands, estuaries, intertidal shorelines, sub-tidal beds, inland saline wetlands as well as a wastewater treatment facility. Coastal saltmarsh and seagrass meadows are dominant within the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site. Smaller areas of freshwater vegetation occur within the Lake Connewarre complex and mangroves at Limeburner's Bay and Barwon Estuary.

The site provides important habitat for many threatened species and is the most important area in Victoria for migratory wading birds. The orange-bellied parrot is known to winter in Port Phillip Bay following their breeding season in Tasmania. Important fish breeding habitat is also present in Swan Bay and Limeburner's Lagoon.

The site also boasts many social and cultural values, including to at least two indigenous language groups. Mud Island is part of Boonwurrung country. The remainder of the site is part of Wathaurong country. Important indigenous sites include burial sites, middens, and artefacts, some of which are at least 5,000 years old.

6.2.6.4 Western Port

The Western Port Ramsar Site is located approximately 60 km to the south-east of Melbourne, occupying a large proportion of the Western Port embayment. It is subject to the Western Port Ramsar Site Management Plan (DELWP 2017c).

Western Port comprises approximately 60,000 ha of many habitats including large shallow intertidal mudflats, seagrass meadows, fringing saltmarsh and mangroves which support a large diversity of birds, fish and invertebrates. The site contains four wetland types including marine subtidal aquatic beds (underwater vegetation), intertidal mud, sand or salt flats, intertidal marshes and intertidal forested wetlands (Hale 2016). Over 20,000 waterbirds utilise the site most years.

The site is located within the traditional lands of the Boonwurrung people, who maintain a strong connection to the waters and the land. Commercial fishing has been banned within the site and is now considered a 'Recreational Fishing Haven.' The Port of Hastings is also within the site which services approximately 200 ships per year.

6.2.7 Nationally Important Wetlands

Nationally Important Wetlands intersecting the Planning Areas are presented in Table 6-6 and Figure 6-7 (PMST Report Appendix E). Wetlands identified in the PMST Report due to the size of the grids used in the PMST but not actually intersecting a Planning Area are listed in the Table with 'X'. Nationally Important Wetlands which intersect a Planning Area and have a coastal component which may be exposed to hydrocarbons from a spill event are discussed in the subsections below.

Information provided on these wetlands is from the DCCEEW Directory of Important Wetlands in Australia.

Table 6-6 Nationally Important Wetlands within the Planning Areas

Nationally Important Wetland	State	Coastal component	Planning Area	
			Bass	Otway
Aire River	VIC	-	-	✓
Anderson Inlet	VIC	✓	-	✓
Benedore River	VIC	✓	X	-
Bungaree Lagoon	TAS	-	-	✓
Coila Creek Delta	NSW	-	X	-
Corner Inlet	VIC	✓	-	X
Jack Smith Lake State Game Reserve	VIC	-	-	X
Lake Ashwood	TAS	-	X	X
Lake Bantick	TAS	-	X	X
Lake Connewarre State Wildlife Reserve	VIC	✓	-	✓
Lake Flannigan	TAS	-	-	✓
Lake Garcia	TAS	-	X	X
Lavinia Nature Reserve	TAS	✓	✓	✓
Lower Aire River Wetlands	VIC	✓	-	✓
Lower Merri River Wetlands	VIC	✓	-	X
Mallacoota Inlet Wetlands	VIC	-	✓	-
Mud Islands	VIC	✓	-	✓
Nadgee Lake and tributary wetlands	NSW	-	✓	-
Nargal Lake	NSW	-	✓	-
Pearshape Lagoons (1-4)	TAS	-	-	✓
Powlett River Mouth	VIC	✓	-	✓
Princetown Wetlands	VIC	✓	-	✓
Rocky Cape Marine Area	TAS	✓	X	-
Swan Bay & Swan Island	VIC	✓	-	✓

Nationally Important Wetland	State	Coastal component	Planning Area	
			Bass	Otway
Tamboon Inlet Wetlands	VIC	✓	X	-
Thompsons Lagoon	TAS	-	X	-
Thurra River	VIC	✓	✓	-
Tower Hill	VIC	-	-	X
Tuross River Estuary	NSW	✓	X	-
Unnamed Wetland	TAS	✓	✓	✓
Wallaga Lake	NSW	✓	X	-
Western Port	VIC	✓	-	✓
Yambuk Wetlands	VIC	-	-	X

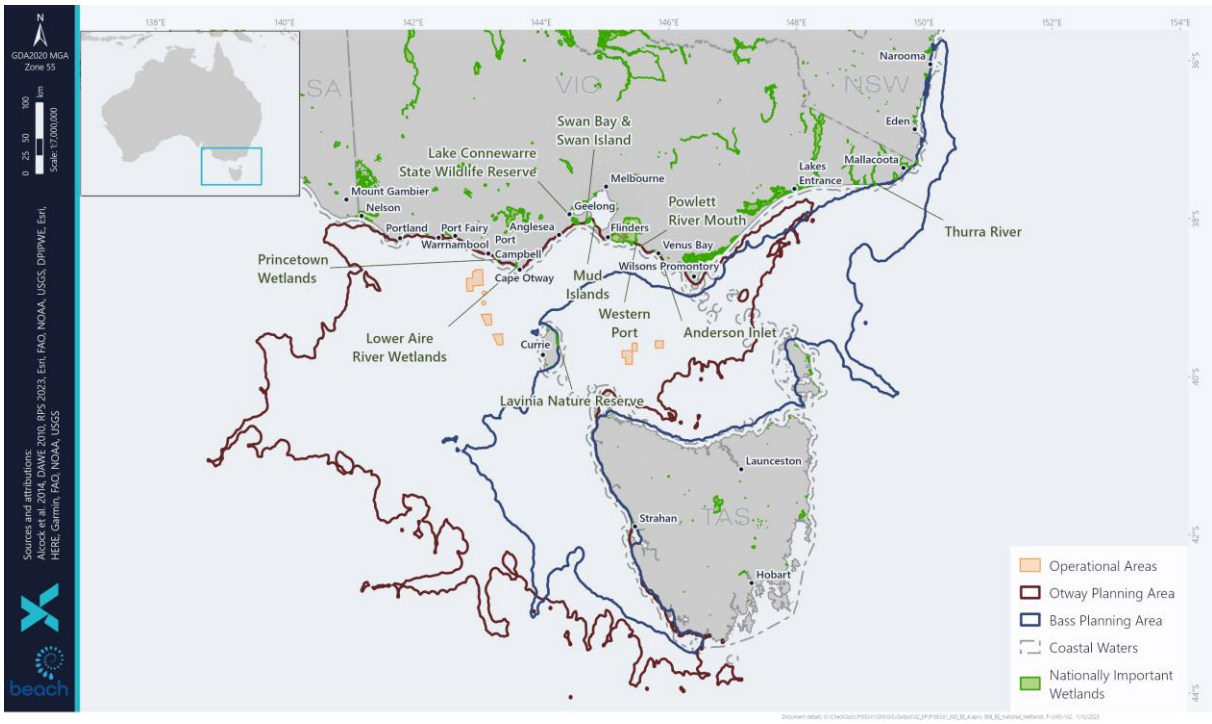


Figure 6-7: Nationally Important Wetlands within the Planning Areas

6.2.7.1 Anderson Inlet

Anderson Inlet is in the South Gippsland Basin on the south-east coast and is one of the largest estuaries in Victoria. Twenty-three species of waterbirds have been recorded at Anderson Inlet including internationally significant numbers of eastern curlew, double-banded plover, sharp-tailed sandpiper, and red-necked stint as well as nationally significant numbers of pacific golden plover and greenshank (SGCS 2003).

Camping in the area is considered a major pressure due to resulting degradation of vegetation and soil compaction. Weeds also pose a threat to the ecological integrity of the reserve as approximately 66% of the 280 flora species recorded are introduced.

6.2.7.2 Lake Connewarre State Wildlife Reserve

Lake Connewarre State Wildlife Reserve is within the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site (see Section 6.2.6.3). The State Wildlife Reserve consists of a State Game Reserve, where duck shooting is permitted and a Nature Conservation Reserve.

6.2.7.3 Lavinia Nature Reserve

Lavinia Nature Reserve is within the Lavinia Ramsar wetland (see Section 6.2.6.2).

6.2.7.4 Lower Aire River Wetlands

These Victorian wetlands consist of three shallow freshwater lakes, brackish to saline marshes and an estuary on the Aire River floodplain. This floodplain occurs at the confluence of the Ford and Calder Rivers with the Aire River. It is surrounded by the Otway Ranges and dune-capped barrier along the ocean shoreline.

The Lower Aire River Wetlands have extensive beds of Common Reed and groves of Woolly Tea-tree which can support large numbers of waterbirds. These wetlands act as a drought refuge for wildlife.

Lake Hordern is of State significance for its geomorphology.

6.2.7.5 Mud Islands

Mud Islands wetland is within the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site (see Section 6.2.6.3).

6.2.7.6 Powlett River Mouth

Powlett River Mouth is in the South Gippsland Basin approximately 130 km to the south-east of Melbourne and supports saltmarsh vegetation. It is subject to the Powlett River Estuary Management Plan (WGCMA 2015).

Orange-bellied parrots have been recorded feeding within the site. Twenty-two fish species have been recorded in the Powlett River, including the Australian grayling (WGCMA 2015). Thirty-one significant bird species have been recorded within the estuary, wetlands, and coastal zone. The dunes near the river mouth have records of Aboriginal cultural heritage significance with a number of coastal midden sites (WGCMA 2015).

6.2.7.7 Princetown Wetlands

The Princetown Wetlands consist of swamps of varying salinity on the floodplains of the Gellibrand River and its tributary, the Serpentine (Latrobe) Creek. Wetland types present are a deep freshwater marsh, semi- permanent saline marshes and a shallow freshwater marsh.

The wetlands have extensive beds of Common Reed (Phragmites australis) and meadows dominated by Beaded Glasswort (*Sarcocornia australis*) which can support large numbers of waterbirds. Significant numbers of the Swamp Greenhood (*Pterostylis tenuissima* (Nv)) occur in the Princetown Wetlands; this species is found under dense Woolly Tea-tree groves.

The wetlands are used for camping, fishing, boating, duck hunting with parts of the wetlands in the Otway National Park and the Serpentine Creek State Wildlife Reserve.

6.2.7.8 Swan Bay & Swan Island

Swan Bay & Swan Island is within the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site (see Section 6.2.6.3) as well as the Swan Island and Naval Waters Commonwealth heritage site (see Section 6.2.4.2).

6.2.7.9 Thurra River

The Thurra River is located within the Croajingolong National Park (see Section 6.2.9.6). The site is classed as a site of state geological and geomorphological significance. Major threats to the wetlands include logging in the upper reaches of the catchment and fauna predation because of feral foxes and cats.

6.2.7.10 Western Port

Western Port is a large bay with extensive intertidal flats, mangroves, saltmarsh, seagrass beds, several small islands and two large islands. Western Port is listed as a Ramsar site as per Section 6.2.6.4.

Western Port is a high value wetland for its ecological, recreational, tourist, scientific, educational, cultural, and scenic features. It is a very good example of a saltmarsh-mangrove-seagrass wetland system.

Western Port is of high value for its avifauna and flora. The bays seagrass flats are nursery grounds for King George Whiting and other species of fish and many birds depend on these areas. Many sites in Western Port are of special significance as breeding, roosting, or feeding sites for waterbirds, including migratory wader.

6.2.8 Victorian Protected Areas – Marine

Victorian marine protected areas identified in the PMST Reports (Appendix E) are presented in Table 6-7 and Figure 6-8. Some Victorian marine protected areas are identified in the PMST Report due to the size of the grids used in the PMST but do not actually intersect a Planning Area. These are listed in Table 6-7 with 'X'. Victorian marine protected areas which intersect a Planning Area are discussed in the subsections below.

Table 6-7: Victorian Marine Protected Areas within the Planning Areas

Protected Area Name	Reserve Type	Planning Area	
		Bass	Otway
Barwon Bluff	Marine Sanctuary	-	✓
Bunurong	Marine National Park	-	✓
Bunurong Marine Park	National Parks Act Schedule 4 park or reserve	-	✓
Cape Howe	Marine National Park	✓	-
Churchill Island	Marine National Park	-	X
Discovery Bay	Marine National Park	-	✓
Eagle Rock	Marine Sanctuary	-	✓
Marengo Reefs	Marine Sanctuary	-	✓
Merri	Marine Sanctuary	-	✓

Protected Area Name	Reserve Type	Planning Area	
		Bass	Otway
Mushroom Reef	Marine Sanctuary	-	✓
Ninety Mile Beach	Marine National Park	-	X
Nooramunga Marine & Coastal Park	National Parks Act Schedule 4 park or reserve	-	X
Point Addis	Marine National Park	-	✓
Point Danger	Marine Sanctuary	-	✓
Point Hicks	Marine National Park	✓	-
Port Phillip Heads	Marine National Park	-	✓
The Arches	Marine Sanctuary	-	✓
Twelve Apostles	Marine National Park	-	✓
Wilsons Promontory	Marine National Park	X	✓
Wilsons Promontory Marine Park	National Parks Act Schedule 4 park or reserve	-	✓
Wilsons Promontory Marine Reserve	National Parks Act Schedule 4 park or reserve	X	✓

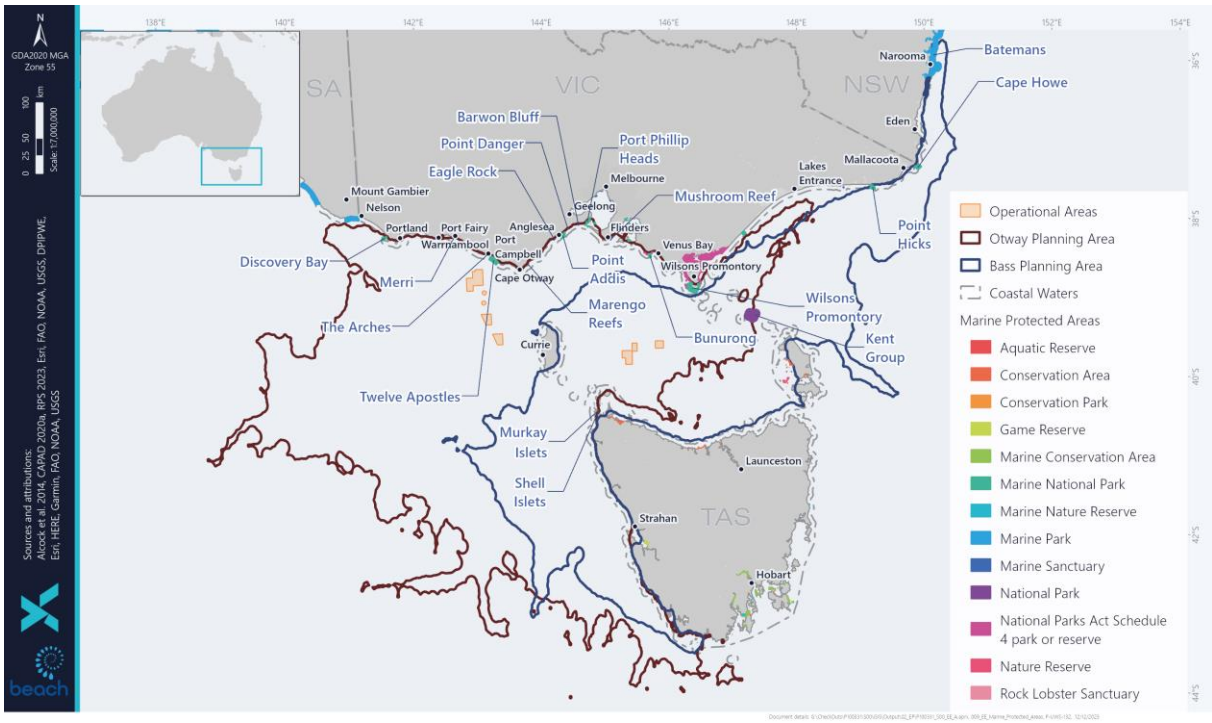


Figure 6-8: State Marine Protected Areas within the Planning Areas

6.2.8.1 Barwon Bluff Marine Sanctuary

The Barwon Bluff Marine Sanctuary are managed through the Barwon Bluff Marine Sanctuary Management Plan (Parks Victoria 2007b). The Plan identifies the key values of the park as:

- Intertidal reef platforms with a high diversity of invertebrate fauna and flora.
- Subtidal reefs that support diverse and abundant flora, including kelps, other brown algae, and green and red algae.
- Calcarenite and basalt reefs extending from The Bluff that are of regional geological significance.
- Intertidal habitats that support resident and migratory shorebirds, including threatened species.
- Subtidal habitats that support sedentary fish and are also used by migratory fish and marine mammals.
- Marine habitats and species that are of scientific interest and valuable for marine education.
- Opportunities for underwater recreation, including visits to subtidal communities that are easily accessible from the shore.
- Outstanding coastal vistas, seascapes and underwater scenery.
- An important landmark and area for gathering fish, shellfish and birds for the Wathaurong people.
- A strong historic and ongoing connection with marine education.
- Remnants from *the Earl of Charlemont*, a heritage-listed shipwreck.

6.2.8.2 Bunurong Marine Park/Marine National Park

The Bunurong Marine National Park is classified as IUCN II (National Parks) and the Bunurong Marine Park as IUCN IV (Habitat/species management area).

The Bunurong Marine National Park and Bunurong Marine Park are managed through the Bunurong Marine National Park Management Plan (Parks Victoria 2006a). The Plan identifies the key values of the Parks as:

- Extensive intertidal rock platforms and subtidal rocky reefs with a geology and form that is uncommon along the Victorian coast.
- Abundant and diverse marine flora and fauna including over 22 species of marine flora and fauna recorded, or presumed to be, at their eastern or western distributional limits (Plummer et al. 2003).
- Highest diversity of intertidal and shallow subtidal invertebrate fauna recorded in Victoria on sandstone (ECC 2000).
- High proportion of the common invertebrates occurring along the Victorian coast.
- High diversity of vegetation communities, many of which are considered rare, depleted or endangered within the region (WGCMA 2003; Carr 2003).
- Important coastal habitat for several threatened species.

- Spectacular coastal scenery, featuring rugged sandstone cliffs, rocky headlands, intertidal rock platforms and sandy cove.
- Eagles Nest, a prominent rock stack, recognised as a site of national geological and geomorphological significance (Buckley 1993).
- One of the richest Mesozoic fossil areas in Victoria.
- Landscape and seascape of cultural significance to Indigenous people.
- Numerous places and objects of significance to Indigenous people.
- European history rich in diversity, including sites associated with shipping, coal mining, holidaying and living on the coast.
- Two historical shipwrecks listed on the Victorian Heritage Register (Heritage Victoria 2004).
- Opportunities for cultural values investigation in an area protected from human disturbance.
- Extensive subtidal reefs with magnificent underwater seascapes, offering numerous opportunities for diving and snorkelling.
- Highly accessible intertidal rock platforms offering opportunities for rock-pooling, marine education, and interpretation.
- Spectacular coastal drive, with numerous lookouts and panoramic views of the coast and surrounding waters.
- Coastline offering opportunities for swimming, surfing, boating, fishing, and rock-pooling in a natural setting.

6.2.8.3 Cape Howe Marine National Park

The Cape Howe Marine National Park is managed under the Cape Howe Marine National Park Management Plan (Parks Victoria 2006c). The key environmental values of the park identified within the park are listed as:

- Diversity of habitats including subtidal and intertidal reefs, subtidal soft sediment, and sandy beaches.
- Co-occurrence of eastern temperate, southern cosmopolitan and temperate species, as a result of the mixing of warm eastern and cool southern waters.
- Marine mammals such as whales, dolphins, Australian fur seals and New Zealand fur seals
- Transient reptiles such as green turtles from northern waters.
- Threatened fauna including whales and birds.
- Foraging area for a significant breeding colony of little penguins from neighbouring Gabo Island.

- Outstanding active coastal landforms within and adjoining the park, such as granite and sandstone reefs.
- Outstanding landscapes, seascapes, and spectacular underwater scenery.
- Victoria's most easterly Marine National Park abutting one of only three wilderness zones on the Victorian coast.
- Opportunities for scientific investigation and learning.
- Opportunities to build knowledge of marine protected areas and their management, and to further understand marine ecological function and changes over time.
- Seascape of high cultural significance to Indigenous people.
- Places and objects of significance to Indigenous people.
- Diverse and rich maritime and post settlement history, including a shipwreck.
- Opportunities for a range of nature-based recreational activities within a pristine and extremely remote wilderness environment.
- Views of Croajingolong National Park (Cape Howe Wilderness Zone) and Gabo Island.
- Opportunities for interpretation and education about the marine environment.

6.2.8.4 Discovery Bay Marine National Park

Discovery Bay Marine National Park protects 2,770 ha within the Southern Ocean and experiences some of the highest wave energy environments in Victoria. It is managed under the Ngootyoong Gunditj Ngootyoong Mara South West Management Plan (Parks Victoria 2015). It is part of *Koonang Mirring* (Sea Country) with the coast of Discovery Bay filled with Aboriginal artefacts that are evidence of earlier ages of plenty and integral to the cultural heritage of the Gunditjmara people.

The Bonney Coast, which extends from Robe in South Australia to Discovery Bay, is a productive area because of a nutrient rich cold water upwelling, known as the Bonney Upwelling, which provides a nutrient-rich environment for fish, whales, seals, penguins, and invertebrates (Parks Victoria 2015).

Conservation Action Planning for marine protected areas across Victoria identified two key focal ecosystems in the park (Parks Victoria 2015):

- Subtidal Reefs with six key natural assets – Brown macroalgae dominated beds, large mobile fish including sharks and rays, motile macroinvertebrates, Giant Kelp Forest communities, sessile invertebrate dominated communities such as thick growths of sponges, ascidians, bryozoans and gorgonians, and mixed red algae sessile invertebrate dominated communities.
- Water Column with key assets including planktonic and other species, baleen whales and seabirds.

6.2.8.5 Eagle Rock Marine Sanctuary

The Eagle Rock Marine Sanctuary covers 17.9 ha and is located along the Victorian Surf Coast in the township of Aireys Inlet, approximately 100 km south-west of Melbourne. The sanctuary extends from the intertidal zone to 300 m offshore and protects many habitats including intertidal and subtidal soft sediment as well as intertidal and subtidal reefs.

It is managed under the Management Plan for Point Addis Marine National Park, Point Danger Marine Sanctuary and Eagle Rock Marine Sanctuary (Parks Victoria 2005c) and is classified as IUCN III. The plan identifies the following environmental, cultural, and social values for the sanctuary:

- Sandy beaches, subtidal soft sediments, subtidal rocky reefs, rhodolith beds and intertidal reefs.
- Eagle Rock, a rock stack of geological significance.
- High diversity of algal, invertebrate and fish species.
- Evidence of a long history of Indigenous use, including many Indigenous places and objects adjacent to the park and sanctuaries near dunes, headlands, estuaries, and creeks.
- Surf breaks, including those at Bells Beach, which are culturally important to many people associated with surfing.
- Coastal seascapes of significance for many who live in the area or visit.
- Recreational and tourism values.
- Spectacular underwater scenery for snorkelling and scuba diving.
- Intertidal areas for exploring rock pools.
- Opportunities for a range of recreational activities.

6.2.8.6 Marengo Reefs Marine Sanctuary

The Marengo Reefs Marine Sanctuary (12 ha) is in Victorian State waters near Marengo and Apollo Bay, which are on the Great Ocean Road, approximately 220 km south-west of Melbourne. The sanctuary protects two small reefs and a wide variety of microhabitats. Protected conditions on the leeward side of the reefs are unusual on this high wave energy coastline and allow for dense growths of bull kelps and other seaweed. There is an abundance of soft corals, sponges, and other marine invertebrates, and over 56 species of fish have been recorded in and around the sanctuary. Seals rest on the outer island of the reef and there are two shipwrecks (the Grange and Woolamai) in the sanctuary (Parks Victoria 2007a).

The Marengo Reefs Marine Sanctuary Management Plan (Parks Victoria 2007a) identifies the environmental, cultural, and social values as:

- Subtidal soft sediments, subtidal rocky reefs, and intertidal reefs.
- High diversity of algal, invertebrate and fish species.

- Australian fur seal haul out area.
- Evidence of a long history of Indigenous use, including many Indigenous places and objects nearby.
- Wrecks of coastal and international trade vessels in the vicinity of the sanctuary.
- Spectacular underwater scenery for snorkelling and scuba diving.
- Intertidal areas for exploring rock pools.
- Opportunities for a range of aquatic recreational activities including seal watching.

6.2.8.7 Merri Marine Sanctuary

Merri Marine Sanctuary covers 29 ha within the city of Warrnambool in south-western Victoria and protects many habitats including intertidal reef, sand, shallow reef, and rocky overhang. These habitats support many species of algae, invertebrates, fish, and shorebirds. Islands adjacent to the sanctuary provide nesting and roosting areas for many species including little penguins, little pied cormorants, short-tailed shearwaters, and pacific gulls. It is managed under the Merri Marine Sanctuary Management Plan (Parks Victoria 2007c) and is classified as IUCN III.

Indigenous tradition indicates that the sanctuary is within the Country of the Peek Wurrung, Gundidj Mara and the Kirrae Whurrong (Parks Victoria 2007c).

6.2.8.8 Mushroom Reefs Marine Sanctuary

Mushroom Reef Marine Sanctuary covers 80 ha along the southern Mornington Peninsula and protects a system of ancient basalt platforms and reefs. The sanctuary is adjacent to Mornington Peninsula National Park, extending from the high water mark to approximately 1 km offshore. The Mushroom Reef Marine Sanctuary Management Plan (Parks Victoria 2007e) identifies the following important natural values:

- Among the most diverse intertidal and rocky reef communities in Victoria.
- Numerous subtidal pools and boulders in the intertidal area that provide a high complexity of intertidal basalt substrates and a rich variety of microhabitats.
- Subtidal reefs that support diverse and abundant flora including kelps, other brown algae, and green and red algae.
- Sandy bottom habitats that support large beds of *Amphibolis* seagrass and patches of green algae.
- Diverse habitats that support sedentary and migratory fish species.
- A range of reef habitats that support invertebrates including gorgonian fans, seastars, anemones, ascidians, barnacles, and soft corals.
- Distinctive basalt causeway that provides habitat for numerous crab, seastar and gastropod species.

- Intertidal habitat that support resident and migratory shorebird species including threatened species.

The Burinyung-Bulluk, one of the six clans that made up the Boonwurrung people, inhabited the coastal area from Point Nepean to Hastings, which incorporates the sanctuary area. The reefs and waters of this coast provided excellent sites for gathering shellfish and hunting fish and seals and were among the most important sources of food for Boonwurrung people (Parks Victoria 2007e).

6.2.8.9 Point Addis Marine National Park

Point Addis Marine National Park lies east of Anglesea and covers 4,600 ha. This park protects representative samples of subtidal soft sediments, subtidal rocky reef, rhodolith beds and intertidal rocky reef habitats. The park also provides habitat for a range of invertebrates, fish, algae, birds and wildlife. The world-famous surfing destination of Bells Beach is within Point Addis Marine National Park.

It is managed under the Management Plan for Point Addis Marine National Park, Point Danger Marine Sanctuary and Eagle Rock Marine Sanctuary (Parks Victoria 2005b) and is classified as IUCN II. The plan identifies the following environmental, cultural, and social values for the parks and sanctuaries:

- Sandy beaches, subtidal soft sediments, subtidal rocky reefs, rhodolith beds and intertidal reefs.
- High diversity of algal, invertebrate and fish species.
- High diversity of sea slugs (opisthobranchs) and other invertebrate communities within Point Danger Marine Sanctuary.
- Evidence of a long history of Indigenous use, including many Indigenous places and objects adjacent to the park and sanctuaries near dunes, headlands, estuaries, and creeks.
- Surf breaks, including those at Bells Beach, which are culturally important to many people associated with surfing.
- Coastal seascapes of significance for many who live in the area or visit.
- Recreational and tourism values.
- Spectacular underwater scenery for snorkelling and scuba diving.
- Intertidal areas for exploring rock pools.
- Opportunities for a range of recreational activities.
- Spectacular seascape complementing well-known visitor experiences on the Great Ocean Road.

6.2.8.10 Point Danger Marine Sanctuary

Point Danger Marine Sanctuary covers 21.7 ha between the townships of Torquay and Jan Juc along Victorian Surf Coast, approximately 100 km south-west of Melbourne. It extends 600 m offshore and encompasses an offshore rock platform, protecting many habitats including intertidal and subtidal soft

sediment as well as intertidal and subtidal reefs which are home to a large diversity of marine plants and invertebrates.

It is managed under the Management Plan for Point Addis Marine National Park, Point Danger Marine Sanctuary and Eagle Rock Marine Sanctuary (Parks Victoria 2005b) and is classified as IUCN III. The plan identifies the following environmental, cultural, and social values for the sanctuary:

- Sandy beaches, subtidal soft sediments, subtidal rocky reefs, rhodolith beds and intertidal reefs.
- High diversity of algal, invertebrate and fish species.
- High diversity of sea slug and other invertebrate communities
- Evidence of a long history of Indigenous use, including many Indigenous places and objects adjacent to the park and sanctuaries near dunes, headlands, estuaries, and creeks.
- Surf breaks, including those at Bells Beach, which are culturally important to many people associated with surfing.
- Coastal seascapes of significance for many who live in the area or visit.
- Recreational and tourism values.
- Spectacular underwater scenery for snorkelling and scuba diving.
- Intertidal areas for exploring rock pools.
- Opportunities for a range of recreational activities.

6.2.8.11 Point Hicks Marine National Park

The Point Hicks Marine National Park is managed under the Point Hicks Marine National Park Management Plan (Parks Victoria 2006e). The plan identifies the key values of the park as:

- Diversity of habitats, including subtidal and intertidal reefs, subtidal soft sediment, and sandy beaches.
- Very high diversity of fauna, including intertidal and subtidal invertebrates.
- Co-occurrence of eastern temperate, southern cosmopolitan and temperate species, as a result of the mixing of warm eastern and cool southern waters.
- Range of rocky habitats, from large boulders to smaller rocks and stones.
- Marine mammals such as dolphins, whales, Australian fur seals and New Zealand fur seals.
- Transient reptiles from northern waters, including turtles and sea snakes.
- Threatened fauna, including whales and several bird species.
- Outstanding landscapes, seascapes and spectacular underwater scenery.

- Outstanding active coastal landforms within and adjoining the park, such as granite reefs and mobile sand dunes.
- Excellent opportunities for scientific investigation and learning.
- Outstanding opportunities to build knowledge of marine protected areas and their management and to further understand marine ecological function and changes over time.
- Seascape and places of significance to Indigenous people.
- Diverse and rich maritime and posts settlement history, including shipwrecks and evidence of shipping history.
- Opportunities for a range of remote nature based recreational activities within a pristine environment.
- Spectacular views of Croajingolong National Park and the Point Hicks Lighthouse.
- Opportunities to view the park from the shore and explore the park without going underwater, by walking along the sandy beaches or investigating the rocky intertidal area.
- Opportunities for interpretation and education about the marine environment.

6.2.8.12 Port Phillip Heads Marine National Park

Port Phillip Heads Marine National Park protects 3,850 ha across six sections including Swan Bay, Mud Islands, Point Lonsdale, Point Nepean, Popes Eye and Portsea Hole. The Port Phillip Heads Marine National Park is managed under the Port Phillip Heads Marine National Park Management Plan (Parks Victoria 2006f). The plan identifies the key values of the park as:

- Incised entrance to Bay (the Rip) and the 'Heads' at Point Nepean and Point Lonsdale.
- Spectacular dive sites such as the Lonsdale and Nepean Walls and popular recreational dive locations.
- Intertidal rock platforms at Cheviot Beach and Point Lonsdale the coastal landscape of Point Nepean in Point Nepean National Park.
- Bottlenose dolphin populations sites listed under the Ramsar Convention for their importance for migratory wading birds (Swan Bay, Mud Islands).
- Distinctive bird-dominated island ecosystem of Mud Islands.
- Sheltered environments such as the seagrass meadows of Swan Bay.

Indigenous tradition indicates that the Mornington Peninsula side of the park, including Mud Islands is part of Country of the Boonwurrung and that the Bellarine Peninsula side of the park is part of Country of the Wathaurong (Parks Victoria 2006f).

6.2.8.13 The Arches Marine Sanctuary

The Arches Marine Sanctuary protects 45 ha of ocean directly south of Port Campbell. It is managed in conjunction with the Twelve Apostles Marine Park under the Management Plan for Twelve Apostles Marine National Park and The Arches Marine Sanctuary (Parks Victoria 2006b).

It has a spectacular dive site of limestone formations, rocky arches, and canyons. The sanctuary is also ecologically significant, supporting habitats such as kelp forests and a diverse range of sessile invertebrates on the arches and canyons. These habitats support schools of reef fish, seals, and a range of invertebrates such as lobster, abalone, and sea urchins.

It is also important to indigenous culture based on spiritual connection to Sea Country.

6.2.8.14 Twelve Apostles Marine National Park

The Twelve Apostles Marine National Park (75 km^2) is located 7 km east of Port Campbell and covers 16 km of coastline from east of Broken Head to Pebble Point and extends offshore to 5.5 km (Plummer et al. 2003).

The area is representative of the Otway Bioregion and is characterised by a submarine network of towering canyons, caves, arches, and walls with a large variety of seaweed and sponge gardens plus resident schools of reef fish. The park contains areas of calcarenite reef supporting the highest diversity of intertidal and sub-tidal invertebrates found on that rock type in Victoria (Parks Victoria 2006b).

The park includes large sandy sub-tidal areas consisting of predominantly fine sand with some medium to coarse sand and shell fragment (Plummer et al. 2003). Benthic sampling undertaken within the park in soft sediment habitats at 10 m, 20 m and 40 m water depths identified 31, 29 and 32 species respectively based upon a sample area of 0.1 m^2. These species were predominantly polychaetes, crustaceans, and nematodes with the mean number of individuals decreasing with water depth (Heisler and Parry 2007). No visible macroalgae species were present within these soft sediment areas (Plummer et al. 2003). These sandy expanses support high abundances of smaller animals such as worms, small molluscs, and crustaceans; larger animals are less common.

The Twelve Apostles Marine Park is managed in conjunction with the Arches Marine Sanctuary under the Management Plan for Twelve Apostles Marine National Park and The Arches Marine Sanctuary (Parks Victoria 2006b) and is classified as IUCN II. The Plan describes the key environmental, cultural and social values as:

- Unique limestone rock formations, including the Twelve Apostles.
- Range of marine habitats representative of the Otway marine bioregion.
- Indigenous culture based on spiritual connection to sea country and a history of marine resource use.
- Wreck of the Loch Ard (shipwreck).
- Underwater limestone formations of arches and canyons.

- Diverse range of encrusting invertebrates.
- Spectacular dive site.

6.2.8.15 Wilsons Promontory Marine National Park

Wilsons Promontory National Park is in South Gippsland, about 200 km south-east of Melbourne and at 15,550 ha is Victoria's largest Marine Protected Area. It extends along 17 km of mainland coastline around the southern tip of Wilsons Promontory and is managed through the Wilsons Promontory Marine National Park and Wilsons Promontory Marine Park Management Plan (Parks Victoria 2006g) and is classified as IUCN II (National Parks). The Plan describes the key environmental, cultural, and social values as:

- Granite habitats, which are unusual in Victorian marine waters, including extensive heavy reefs with smooth surfaces, boulders and rubble and low-profile reefs.
- Biological communities with distinct biogeographic patterns, including shallow subtidal reefs, deep subtidal reefs.
- Intertidal rocky shores, sandy beaches, seagrass, and subtidal soft substrates.
- Abundant and diverse marine flora and fauna, including hundreds of fish species and invertebrates such as sponges, ascidians, sea whips and bryozoans.
- 68 species of marine flora and fauna recorded, or presumed to be, at their eastern or western distributional limits.
- Important breeding sites for a significant colony of Australian fur seals.
- Important habitat for several threatened shorebird species, including species listed under international migratory bird agreements.
- Outstanding landscapes, seascapes, and spectacular underwater scenery.
- Seascape, cultural places, and objects of high traditional and cultural significance to Indigenous people.
- Indigenous cultural lore and interest maintained by the Gunai/Kurnai and Boonwurrung people.
- Important maritime and other history.
- Historic shipwrecks, many of which are listed on the Victorian Heritage Register.

6.2.9 Victorian Protected Areas – Terrestrial

Victorian terrestrial protected areas identified in the PMST Reports (Appendix E) are presented in Table 6-8 and Figure 6-9. Some Victorian terrestrial protected areas were identified in the PMST Report due to the size of the grids used in the PMST but do not actually intersect a Planning Area. These are listed in Table 6-8 with 'X'. Victorian terrestrial protected areas which intersect a Planning Area and have a coastal component which may be exposed to hydrocarbons from a spill event are discussed in the subsections below where information is available.

Table 6-8: Victorian Terrestrial Protected Areas Intersecting the Planning Areas

Protected Area Name	Reserve Type	Coastal Component	Planning Area	
			Bass	Otway
Aire River	Heritage River	✓	-	✓
Aire River W.R.	Natural Features Reserve	✓	-	✓
Aireys Inlet B.R.	Natural Features Reserve	-	-	✓
Anglesea B.R.	Natural Features Reserve	-	-	✓
Anser Island	Reference Area	✓	-	✓
Baawang	Reference Area	-	✓	-
Bald Hills B.R.	Natural Features Reserve	-	-	X
Barham Paradise S.R.	Natural Features Reserve	-	-	X
Bats Ridge W.R	Nature Conservation Reserve	-	-	X
Bay of Islands Coastal Park	Conservation Park	✓	-	✓
Calder River	Reference Area	-	-	X
Cape Howe	Wilderness Zone	✓	✓	-
Cape Liptrap Coastal Park	Conservation Park	✓	-	✓
Cape Nelson	State Park	✓	-	✓
Cape Patterson N.C.R	Natural Features Reserve	-	-	✓
Crib Point B.R.	Natural Features Reserve	-	-	X
Crinoline Creek	Reference Area	-	-	X
Croajingolong	National Park	✓	✓	-
Curdie Vale N.C.R.	Natural Features Reserve	-	-	X
Deen Maar	Indigenous Protected Area	✓	-	X
Discovery Bay Coastal Park	Conservation Park	✓	-	✓
East Gippsland Coastal streams	Natural Catchment Area	✓	✓	-
Edna Bowman N.C.R.	Natural Features Reserve	-	-	✓
Fingal B.R	Natural Features Reserve	-	-	X
Flinders B.R./N.F.R.	Natural Features Reserve	-	-	X
French Island	National Park	✓	-	✓
Goose Lagoon W.R	Natural Features Reserve	-	-	X
Great Otway	National Park	✓	-	✓
Hedditch Hill S.R.	Natural Features Reserve	-	-	X
Jack Smith Lake W.R	Natural Features Reserve	-	-	X

Protected Area Name	Reserve Type	Coastal Component	Planning Area	
			Bass	Otway
Johanna Falls S.R.	Natural Features Reserve	-	-	✓
Kilcunda N.C.R.	Natural Features Reserve	-	-	✓
Lady Julia Percy Island W.R.	Nature Conservation Reserve	✓	-	✓
Lake Aringa W.R	Nature Conservation Reserve	-	-	X
Lake Connewarre W.R	Natural Features Reserve	✓	-	✓
Lake Denison W.R	Natural Features Reserve	-	-	X
Lake Gillear W.R	Natural Features Reserve	-	-	✓
Latrobe B.R.	Natural Features Reserve	-	-	X
Lawrence Rocks W.R.	Nature Conservation Reserve	✓	-	✓
Lonsdale Lakes W.R	Nature Conservation Reserve	-	-	✓
Lower Glenelg	National Park	-	-	X
Main Ridge N.C.R.	Natural Features Reserve	-	-	X
Marengo N.C.R.	Nature Conservation Reserve	-	-	✓
Mornington Peninsula	National Park	✓	-	✓
Mount Richmond	National Park	-	-	X
Mount Vereker Creek	Natural Catchment Area	✓	-	X
Parker River	Reference Area	-	-	✓
Phillip Island Nature Park	Other	✓	-	✓
Point Nepean	National Park	✓	-	✓
Port Campbell	National Park	✓	-	✓
Portland B.R.	Natural Features Reserve	-	-	X
Princetown W.R	Natural Features Reserve	-	-	✓
Queenscliff N.F.R	Natural Features Reserve	-	-	✓
Rame Head	Remote and Natural Area - Schedule 6, National Parks Act	✓	✓	-
Reef Island and Bass River Mouth N.C.R	Natural Features Reserve	✓	-	X
Salt Lagoon, St Leonards W.R	Nature Conservation Reserve	-	-	X
Sandpatch	Wilderness Zone	✓	✓	-
Seal Creek	Reference Area	-	X	-

Protected Area Name	Reserve Type	Coastal Component	Planning Area	
			Bass	Otway
Seal Islands W.R.	Nature Conservation Reserve	✓	-	✓
Southern Wilsons Promontory	Remote and Natural Area - Schedule 6, National Parks Act	✓	X	✓
Stony Creek (Otways)	Reference Area	✓	-	✓
Swan Bay - Edwards Point W.R.	Nature Conservation Reserve	✓	-	✓
Tower Hill W.R	Natural Features Reserve	✓	-	X
Trewalla B.R.	Natural Features Reserve	-	-	X
Unnamed P0176	Private Nature Reserve	-	-	✓
Ventnor B.R.	Natural Features Reserve	-	-	✓
Vereker Creek	Reference Area	✓	-	X
Waratah B.R	Natural Features Reserve	-	-	X
Wild Dog B.R.	Natural Features Reserve	-	-	X
Wild Dog Creek SS.R.	Natural Features Reserve	-	-	✓
Wilsons Promontory	National Park	✓	X	✓
	Wilderness Zone	✓	-	X
Wilsons Promontory Islands	Remote and Natural Area - Schedule 6, National Parks Act	✓	-	✓
Wongarra B.R.	Natural Features Reserve	-	-	X
Wonthaggi B.R.	Natural Features Reserve	-	-	X
Wonthaggi Heathlands N.C.R.	Natural Features Reserve	-	-	✓
Yambuk F.F.R.	Nature Conservation Reserve	✓	-	X

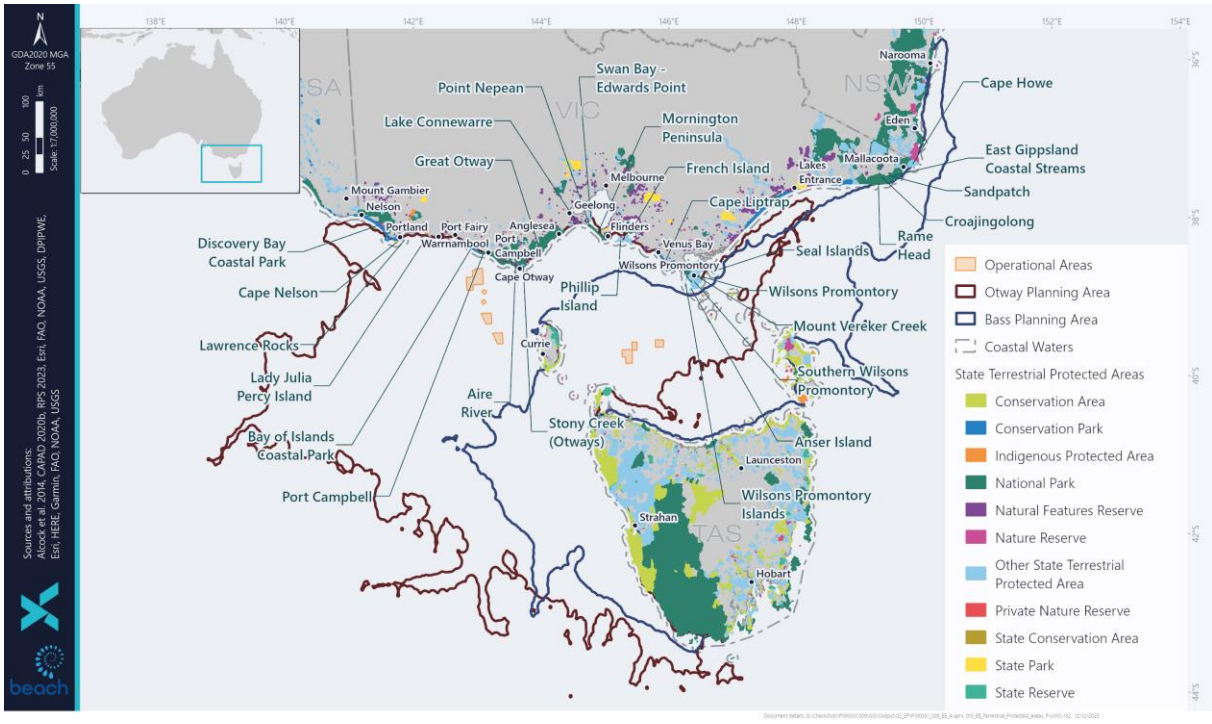


Figure 6-9: State Terrestrial Protected Areas within the Planning Areas - Victoria

6.2.9.1 Aire River Heritage River

The Aire River is a perennial river of the Corangamite catchment, located in the Otway region. The river generally flows west by south then south through the Great Otway National Park (see Section 6.2.9.9), joined by three minor tributaries, before reaching its mouth and emptying into Bass Strait west of Cape Otway. It is a popular fishing and camping area. It is managed under the Aire River Estuary Management Plan 2015-2023 (Corangamite CMA 2015).

6.2.9.2 Anser Island

Anser Island is the largest island of the Anser Group, spanning 80 ha and located 1.5 km south-west of Wilsons Promontory. Anser Island is within the Wilsons Promontory National Park (see Section 6.2.9.17) and managed under its management plan. The general management aim of reference areas is to protect viable samples of one or more land types that are relatively undisturbed for comparative study with similar land types elsewhere, by keeping all human interference to the essential minimum and ensuring as far as practicable that the only long-term change results from natural processes (Parks Victoria 2002).

6.2.9.3 Bay of Islands Conservation Park

This coastal park has outstanding ocean views and geological features and covers an extensive area of the coastline (~32 km in length and 950 ha), stretching east from Warrnambool to Peterborough. Sheer cliffs and rock stacks dominate the bays, and the heathlands contain wildflowers. Beaches are accessible at some points (Parks Victoria 1998).

This park protects the terrestrial environment above the low water mark of this coastline. This Coastal Park is protected under the Port Campbell National Park and Bay of Islands Coastal Park Management Plan (Parks Victoria 1998).

6.2.9.4 Cape Liptrap Conservation Park

Cape Liptrap Coastal Park is located in South Gippsland, 180 km south-east of Melbourne. It is protected under the Cape Liptrap Coastal Park Management Plan (Parks Victoria 2003), which identifies the environmental, cultural, and social values as:

- Extensive heathland and coastal forest vegetation communities.
- Occurrence of about 270 species of flowering plants, including 27 orchid species.
- 30 threatened fauna species, including ten species listed as threatened under the Flora and Fauna Guarantee Act 1988 (Vic.), 17 migratory bird species and ten threatened flora species.
- One of the most interesting and complex geological sequences in the State, ranging from ancient Cambrian rocks to Recent sands.
- Spectacular coastal landforms at Cape Liptrap, Arch Rock and at Walkerville.
- Numerous middens and other significant Aboriginal sites.
- Relics of the lime-burning industry at Walkerville.
- Cape Liptrap lighthouse.
- Spectacular and diverse coastal scenery.
- Opportunities for fishing, nature observation, camping, and walking in natural settings.

This park protects the terrestrial environment above the low water mark of this coastline.

6.2.9.5 Cape Nelson State Park

Cape Nelson State Park is located in south-western Victoria and is managed under the under the Ngootyoong Gunditj Ngootyoong Mara South West Management Plan (Parks Victoria 2015). Key features of this state park include:

- Presence of numerous walks, including a portion of the 250 km Great South West Walk.
- Diverse and representative vegetation of coastal Victoria, including heath, wet heath, and soap mallee communities.
- Habitat for restricted fauna species, including black wallabies, bandicoots, and firetail finches.

6.2.9.6 Croajingolong National Park (Including Cape Howe Wilderness Zone, East Gippsland Coastal Streams, Rame Head Remote and Natural Area, Sandpatch Wilderness Zone)

Croajingolong National Park is located in south-western Victoria and is managed under the Croajingolong National Park Management Plan (Parks Victoria 1996). The plan identifies the following environmental values within the park:

- Wide variety of coastal landforms including tidal inlets, estuaries and lagoons, dune-blocked lake and swamp systems, freshwater interdune lakes, extensive sand dunes and sand sheets, and prominent rocky cliffs.
- Many sites recognised for their geological and geomorphological significance.
- Habitats supporting over 1,000 recorded native plant species, 87 of which are listed as threatened in Victoria and have primary habitat within the Park.
- 90 species of orchids, including all five of Australia's lithophytic and epiphytic orchids.
- Significant and well developed sites of Warm Temperate Rainforest in the lower reaches of a number of rivers, notably Wau Wauka Creek, Harrisons Creek and Dowell Creek.
- Coastal Heathland, a community considered to be extremely species rich, and covering up to 10% of the Park.
- Habitats supporting 43 species of threatened fauna, including the little tern, ground parrot, eastern bristle-bird, eastern broad-nosed bat, and Australian fur-seal.
- The Skerries, one of only four Australian fur-seal colonies in the State and an important breeding site for penguins and other seabirds.
- Records for the Park include one third of Victoria's and one quarter of Australia's bird species.
- Some of the richest amphibian habitats in Victoria.
- Coastal streams and catchments which are relatively undisturbed, with an absence of introduced fish species and good populations of native fish species.
- Localities with among the highest wilderness quality in the State, outside the mallee, and two of the three coastal wilderness areas in Victoria
- An area of major significance and importance in Victoria for the conservation and protection of Aboriginal sites.
- Sites giving an insight into the European history of the State, with evidence of maritime history, settlement, utilisation and the reservation of parks.
- The site of the first European sighting of eastern mainland Australia by Lieutenant Hicks aboard the *Endeavour* in 1770.

6.2.9.7 Discovery Bay Coastal Park

Discovery Bay Coastal Park comprises 10,460 ha and extends along the coast of Discovery Bay from Cape Nelson north-westwards for 50 km to the border with South Australia. The park is managed under the Ngootyoong Gunditj Ngootyoong Mara South West Management Plan (Parks Victoria 2015).

- Part of the Great South West Walk, a long distance 250 km semi-remote hiking trail.
- The Cape Bridgewater fur seal colony is located within the park.

- The beaches are part of the stronghold for hooded plovers in Victoria.
- Glenelg River Heritage River.
- Remote and natural setting for experienced surfers.

6.2.9.8 French Island National Park

French Island National Park protects 11,100 ha of wetlands of international significance and is the only national park in Victoria totally contained on an island. It is the largest island along the Victorian coastline, located off the Mornington Peninsula in Western Port (see Section 6.2.6.4) and characterised by a range of coastal habitats including rocky shorelines, sandy beaches, mangroves, saltmarshes and wetlands. More than 230 bird species have been recorded on French Island, including the orange-bellied parrot, white-bellied sea eagle and 33 species of waders.

The park is protected under the French Island National Park Management Plan (Parks Victoria 1998a) which identifies the following natural values:

- The only substantial representation of the land systems of the coastal sand plains and clayey-sand plains of Western Port within the State's nature conservation reserve system.
- Extensive mangrove and saltmarsh areas along the north coast which are of State geomorphological importance.
- Part of the Western Port site listed under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) see Section 6.2.6.4.
- Habitat for a vast number of migratory birds which are listed under the JAMBA and CAMBA.
- The sand spit along the west coast is an important research site for sediment movement and coastal dynamics.
- Rich flora with more than 580 species, including about 100 orchids and 12 threatened species.
- Vegetation of at least State botanical significance, with high quality representative samples of sand heathland, shrubby foothill forest, coastal heathland, coastal saltmarsh, and swamp sedgeland and grassland.

Fauna of international and national significance, including more than 260 species, whose conservation is enhanced by the island's isolation from the mainland preventing colonisation by foxes and limiting the degree of habitat disturbance.

6.2.9.9 Great Otway National Park (including Stony Creek Reference Area)

The Great Otway National Park (103,185 ha) is located near Cape Otway and stretches from the low water mark inland on an intermittent basis from Princetown to Apollo Bay (approximately 100 km).

Landscapes within the park are characterised by tall forests and hilly terrain extending to the sea with cliffs, steep and rocky coasts, coastal terraces, landslips, dunes and bluffs, beaches and river mouths. There is a concentration of archaeological sites along the coast, coastal rivers and reefs. The park contains many sites of international and national geological and geomorphological significance

including Dinosaur Cove (internationally significant dinosaur fossil site), Lion Headland and Moonlight Head to Milanesia Beach (internationally significant coastal geology and fossils).

The park provides habitats for the conservation of the rufous bristlebird, hooded plover, white-bellied sea eagle, fairy tern, Caspian tern and Lewin's rail and native fish such as the Australian grayling.

The park contains significant Aboriginal cultural sites adjacent to rivers, streams and the coastline including over 100 registered archaeological sites, particularly shell middens along the coast, as well as non-physical aspects such as massacre sites, song lines, family links and stories. The park also contains four sites listed on the Victorian Heritage Register including the Cape Otway Light Station and several shipwreck features along the coast (i.e. anchors) (Parks Victoria and DSE 2009).

This park protects the terrestrial environment above the low water mark of this coastline. The Park is protected under the Great Otway National Park and Otway Forest Park Management Plan (Parks Victoria and DSE 2009) and relevant values are:

- Large area of essentially unmodified coastline, linking the land to marine ecosystems and marine national parks.
- Diverse range of lifestyle and recreation opportunities for communities adjacent to the parks – for local permanent residents and holiday homeowners Regionally, nationally, and internationally.
- Significant tourist attractions, close to access routes and accommodation, such as spectacular coastal scenery along the Great Ocean Road, access to beautiful beaches, clifftop lookouts, picnic areas, historic sites, waterfalls and walking tracks such as the Great Ocean Walk.
- The basis for continued growth of nature-based tourism associated with the parks and the region, providing economic opportunities for accommodation providers, food and services providers, and recreation, tourism and education operators.

6.2.9.10 Deen Maar (Lady Julia Percy) Island Wilderness Reserve

Deen Maar (Lady Julia Percy) Island is located 21 km south-west of Port Fairy and is one of four Australian fur-seal breeding colonies in Victoria and the largest known breeding colony in Australia.

6.2.9.11 Lake Connewarre Wilderness Reserve

Lake Connewarre Wilderness Reserve is within the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site (see Section 6.2.6.3).

6.2.9.12 Lawrence Rocks Wildlife Reserve

Lawrence Rocks are two rocky islets and an associated reef 2.4 km south-east of Point Danger and is classified an Important Bird Area due to supporting a breeding colony of over 10% of the world's known population of Australasian gannets (BirdLife 2024a). Lawrence Rocks are the remnant peaks of a submerged volcano (Parks Victoria 2015).

Lawrence Rocks comes under the Ngootyoong Gunditj Ngootyoong Mara South West Management Plan (Parks Victoria 2015).

6.2.9.13 Mornington Peninsula National Park

Mornington Peninsula National Park protects 2,686 ha of land along the coast approximately 70 km south of Melbourne, often described as 'Melbourne's Playground' due to its popularity for recreation. Mornington Peninsula National Park is the most visited park in Victoria.

The park is managed under the Mornington Peninsula National Park and Arthurs Seat State Park Management Plan (Parks Victoria 1998c) which identifies the following values:

- Largest and most significant remaining areas of native vegetation on the Mornington Peninsula.
- Numerous sites and features of geomorphic significance, particularly along the coast (cliffed calcarenite coast, sandy forelands and basalt shore platforms).
- Only representation in the Victorian conservation reserve system of four particular land systems formed within the Southern Victorian Coastal Plains and the Southern Victorian Uplands.
- Many significant native plants and vegetation communities.
- Highly scenic landscape values along the ocean coast and at Port Phillip heads and prominent feature of Arthurs Seat.
- One of the highest recorded densities of Aboriginal archaeological sites along the Victorian Coast.
- Many significant fauna species, including populations of the nationally significant Hooded Plover, over 30 species of State significance and many species of regional significance.
- High quality marine and intertidal habitats, with some pristine areas within Point Nepean.

6.2.9.14 Phillip Island Nature Park

Phillip Island is east of Melbourne and forms a natural breakwater for the shallow waters of Western Port. It is known by its Traditional Owners, the Bunurong, as Millowl and forms part of the Kulin nation with a history dating back tens of thousands of years (SoV 2021). Today the Island is a popular tourist destination, due to a range of nature-based experiences and attractions along with boating, fishing, sporting opportunities and national and international motor racing events.

Phillip Island is Biologically Important Area (BIA) for the little penguin, with breeding and foraging sites present (DCCEEW 2023h). The successful eradication of foxes has contributed to the strong recovery of several species including little penguins and short-tailed shearwaters (SoV 2021).

6.2.9.15 Point Nepean National Park

Point Nepean National Park protects 560 ha of land at the tip of Mornington Peninsula and is managed under the Point Nepean National Park Master Plan (Parks Victoria 2017). The park is surrounded by Port Phillip Heads Marine National Park (see Section 6.2.8.12). The park is of great cultural significance as a sacred place to Traditional Owners for over 35,000 years, a landmark and natural resource to European settlers, as well as a line of defence for Victoria and Australia (Parks Victoria 2017). Restricted access has allowed the park to maintain the largest and most intact area of remnant coastal vegetation on the Port Phillip coast and Victoria's largest remnant area of coastal

alkaline scrub. Intertidal rock platforms support a diverse marine ecosystem while dune habitats provide roosting and feeding opportunities for resident and migratory seabirds.

6.2.9.16 Port Campbell National Park

Port Campbell National Park and Bay of Islands Coastal Park combine to form a linear reserve along 65 km of Victoria's southern ocean coastline and contain a number of major tourist attractions, including the 'Twelve Apostles'. The park is managed under the Port Campbell National Park and Bay of Islands Coastal Park Management Plan (Parks Victoria 1998).

The park natural values include various fauna such as the little penguin, short-tailed shearwater and various whale species (Parks Victoria 2019b).

Within the park is evidence of Aboriginal activities, including shell middens, stone artefacts, and staircases cut into the coastal cliffs (Parks Victoria 2019b).

6.2.9.17 Seal Islands Wildlife Reserve

Seal Islands Wildlife Reserve is located approximately 14 km east of Wilsons Promontory and is part of the Wilsons Promontory Islands Important Bird Area (BirdLife International 2024b).

6.2.9.18 Swan Bay - Edwards Point Wildlife Reserve

Edwards Point Wildlife Reserve protects a 4 km sand spit within Swan Bay. See Sections 6.2.6.3 and 6.2.8.12 for further details about ecological significance.

6.2.9.19 Wilsons Promontory National Park including South Wilsons Promontory and Wilsons Promontory Islands

The Wilsons Promontory National Park is in South Gippsland, about 200 km southeast of Melbourne and includes the Wilsons Promontory Wilderness Zone, Southern Wilsons Promontory Remote and Natural Area and Wilsons Promontory Islands. It is managed under the Wilsons Promontory National Park Management Plan. The Plan identifies the key environmental, social and cultural values as (Parks Victoria 2002):

- Entire promontory of national, geological and geomorphological significance containing a number of sites of State and regional significance.
- Diverse vegetation communities, including warm temperate and cool temperate rainforest, tall open forests, woodlands, heathlands, and swamp and coastal communities.
- Unmodified rivers and streams with no introduced fish species.
- Half of Victoria's bird species.
- Intertidal mudflats, which are an internationally important habitat for migratory wading birds.
- Largest coastal wilderness area in Victoria.
- Numerous middens and other significant Aboriginal sites.

- Remains of sites of several small European settlements and past uses including timber milling, mining, and grazing.
- A number of shipwrecks in the waters around Wilsons Promontory.
- Heritage buildings of Wilsons Promontory Light Station.
- Outstanding natural landscapes including spectacular and diverse coastal scenery.

This park protects the terrestrial environment above the low water mark of this coastline.

6.2.10 Tasmanian Protected Areas - Marine

Tasmanian marine protected areas identified in the PMST Reports (Appendix E) are presented in Table 6-9 and Figure 6-9. Some Tasmanian marine protected areas were identified in the PMST Report due to the size of the grids used in the PMST but do not actually intersect a Planning Area. These are listed in Table 6-9 with 'X'. Tasmanian marine protected areas which intersect a Planning Area are discussed in the subsections below where information is available.

Table 6-9: Tasmanian Marine Protected Areas within the Planning Areas

Protected Area Name	Reserve Type	Planning Area	
		Bass	Otway
Arthur Bay	Conservation Area	✓	-
Chappell Islands	Nature Reserve	✓	-
Kent Group	National Park	✓	✓
Marriott Reef	Conservation Area	✓	-
Murkay Islets	Conservation Area	✓	✓
Pardoe Northdown	Conservation Area	X	-
Reef Island	Conservation Area	✓	-
Shell Islets	Conservation Area	✓	✓
Unnamed (Duck Bay)	Conservation Area	X	-
West Inlet	Conservation Area	X	-

6.2.10.1 Kent Group National Park

Kent Group National Park is made up of islands and islets, situated halfway between Wilsons Promontory in Victoria and Flinders Island off Tasmania's north-eastern tip. Kent Group National Park is in the middle of Bass Strait where it is subject to a constant barrage of wild seas and currents that with it brings richness in nutrients that supports a unique diversity of marine life. The islands are an important refuge for seabirds along with providing a sanctuary for the Australian fur-seals who make their home on the rocky outcrops (DPIPWE 2021).

Several sites of Aboriginal occupation are known in the park (PWS 2005).

6.2.10.2 Murkay Islets Conservation Area

The Murkay Islets are part of the Trefoil Island Group near Cape Grim off the north-western coast of Tasmania, comprising a combined area of approximately 0.5 ha. They are also included in the Hunter Island Group Important Bird Area, recognised by BirdLife Australia for providing important breeding habitat for significant bird species including the short-tailed shearwater, black-faced cormorant, Pacific gull and orange-bellied parrot (BirdLife International 2023a).

6.2.10.3 Shell Islets Conservation Area

The Shell Islets are a group of small islands within the Trefoil Island Group near Cape Grim off the north-western coast of Tasmania, comprising a combined area of approximately 0.08 ha (Brothers et al. 2001). The islets provide important breeding and foraging habitat for several seabird, shorebird and wader species including the Caspian tern, red-necked stints and sanderlings.

6.2.11 Tasmanian Protected Areas – Terrestrial

Tasmanian terrestrial protected areas identified in the PMST Reports (Appendix E) are presented in Table 6-10 and Figure 6-10. Areas identified in the PMST Report due to the size of the grids used in the PMST but not actually intersecting a Planning Area are listed in the Table with 'X'. Tasmanian terrestrial protected areas which intersect a Planning Area and have a coastal component which may be exposed to hydrocarbons from a spill event are discussed in the subsections below, where information is available. Indigenous Protected Areas are described in Section 6.6.2.5.

Table 6-10 Tasmanian Terrestrial Protected Areas within the Planning Areas

Protected Area Name	Reserve Type	Coastal Component	Planning Area	
			Bass	Otway
Albatross Island	Nature Reserve	✓	✓	✓
Anderson Islands	Conservation Area	✓	X	-
Arthur River Rd Marrawah	Conservation Covenant	-	X	X
Arthur-Pieman	Conservation Area	✓	✓	✓
Badger Box Creek	Nature Reserve	-	-	✓
Badger Island	Indigenous Protected Area	✓	✓	-
Badger River	Regional Reserve	-	X	X
Bass Pyramid	Nature Reserve	✓	✓	✓
Bernafai Ridge	Conservation Area	-	-	X
Big Green Island	Nature Reserve	✓	✓	
Bird Island	Game Reserve	✓	✓	✓
Black Pyramid Rock	Nature Reserve	✓	✓	✓
Blyth Point	Conservation Area	✓	✓	-
Boat Harbour Road Killiecrankie	Conservation Covenant	-	✓	-
Bond Tier	Regional Reserve	-	-	X

Protected Area Name	Reserve Type	Coastal Component	Planning Area	
			Bass	Otway
Boxen Island	Conservation Area	✓	✓	-
Brick Islands	Conservation Area	✓	X	-
Brougham Sugarloaf	Conservation Area	-	X	-
Bull Rock	Conservation Area	✓	✓	-
Bun Beetons Point	Conservation Area	✓	✓	-
Calm Bay	State Reserve	✓	✓	✓
Cape Sorell	Historic Site	✓	✓	✓
Cape Wickham	Conservation Area	✓	X	✓
	State Reserve	-	X	✓
Cataraqui Point	Conservation Area	✓	X	✓
Chalky Island	Conservation Area	✓	✓	-
Christmas Island	Nature Reserve	✓	-	✓
City of Melbourne Bay	Conservation Area	✓	✓	✓
Colliers Forest Reserve	Conservation Covenant	-	X	✓
Colliers Swamp	Conservation Area	-	✓	✓
Comeback Rd Marrawah	Conservation Covenant	-	-	X
Cone Islet	Conservation Area	✓	✓	✓
Councillor Island	Nature Reserve	✓	✓	✓
Counsel Hill	Conservation Area	-	X	✓
Craggy Island	Conservation Area	✓	✓	-
Crayfish Creek	Regional Reserve	-	X	-
Currie Lightkeepers Residence	Historic Site	-	-	✓
Curtis Island	Nature Reserve	✓	✓	✓
Darling Range	Conservation Area	-	X	-
Deep Lagoons	Conservation Area	-	-	✓
Devils Tower	Nature Reserve	✓	✓	✓
Disappointment Bay	State Reserve	✓	X	✓
Doughboy Island	Conservation Area	✓	✓	-
East Kangaroo Island	Nature Reserve	✓	✓	-
East Moncoeur Island	Conservation Area	✓	✓	✓
Edgcumbe Beach	Conservation Area	✓	X	-
Egg Beach	Conservation Area	✓	✓	-
Eldorado	Conservation Area	-	X	✓

Protected Area Name	Reserve Type	Coastal Component	Planning Area	
			Bass	Otway
Emita	Nature Recreation Area	✓	✓	-
Foochow	Conservation Area	✓	X	-
Forwards Beach	Conservation Area	✓	X	-
Fotheringate Bay	Conservation Area	✓	✓	-
Four Mile Beach	Regional Reserve	✓	✓	✓
Gentle Annie	Conservation Area	-	X	✓
Goose Island	Conservation Area	✓	✓	-
Harbour Islets	Conservation Area	✓	✓	✓
Harcus Island	Conservation Area	✓	X	X
Harcus River Rd West Montagu	Conservation Covenant	-	X	X
Harcus River Road	NRS Addition - Gazettal in Progress	-	X	X
Harcus River Road #4	Conservation Covenant	-	X	X
Harcus River Road Marrawah	Conservation Covenant	-	X	X
Henderson Islets	Conservation Area	✓	✓	✓
Highfield	Historic Site	-	✓	-
Hogan Group	Conservation Area	✓	✓	✓
Holts Point	Conservation Area	✓	✓	-
Hunter Island	Conservation Area	✓	✓	✓
Isabella Island	Nature Reserve	✓	✓	-
Jacksons Cove	Conservation Area	✓	✓	-
Kangaroo Island	Conservation Area	✓	✓	-
Kentford Forest	Conservation Area	-	-	✓
	Nature Reserve	-	-	✓
Kentford Rd Nugara	Conservation Covenant	-	-	✓
Killiecrankie	Nature Recreation Area	✓	✓	-
Kings Run	Private Nature Reserve	-	✓	✓
Kings Run #2	Conservation Covenant	-	✓	✓
Kuhns Rd Memana	Conservation Covenant	-	X	-
Lavinia	State Reserve	✓	✓	✓
Lily Lagoon	Nature Reserve	-	-	✓
Little Chalky Island	Conservation Area	✓	✓	-
Little Island	Conservation Area	✓	✓	-

Protected Area Name	Reserve Type	Coastal Component	Planning Area	
			Bass	Otway
Little Peggs Beach	State Reserve	✓	X	-
Little Trefoil	Conservation Area	✓	✓	✓
Long Island	Conservation Area	✓	✓	-
Low Point	Conservation Area	✓	✓	-
lungatalanana	Indigenous Protected Area	✓	✓	-
Lymwood	Conservation Covenant	-	-	✓
Lyons Cottage	Historic Site	-	✓	-
Macquarie Harbour	Historic Site	-	✓	-
Marshall Beach	Conservation Area	✓	✓	-
Mile Island	Conservation Area	✓	✓	-
Millwood Road	Conservation Covenant	-	X	✓
Mount Chappell Island	Indigenous Protected Area	✓	✓	-
Mount Dundas	Regional Reserve	-	X	X
Mount Heemskirk	Regional Reserve	✓	✓	✓
Mount Tanner	Nature Recreation Area	✓	✓	-
Muddy Lagoon	Nature Reserve	-	-	✓
Mulligans Hill	Conservation Area	-	✓	-
	Conservation Covenant	-	X	-
Nares Rocks	Conservation Area	✓	✓	✓
Neds Reef	Conservation Area	✓	X	-
New Year Island	Game Reserve	✓	X	✓
Night Island	Conservation Area	✓	✓	-
Ninth Island	Conservation Area	✓	✓	-
North East Islet	Nature Reserve	✓	✓	✓
North East River	Game Reserve	✓	✓	-
Ocean Beach	Conservation Area	✓	✓	✓
Oyster Rocks	Conservation Area	✓	✓	-
Palana Beach	Nature Recreation Area	✓	✓	-
Pasco Group	Conservation Area	✓	✓	-
Pegarah	Private Nature Reserve	-	X	✓
Pegarah Forest	Conservation Covenant	-	X	✓
Pegarah Rd King Island	Conservation Covenant	-	X	✓
Penguin Islet	Nature Reserve	✓	✓	-

Protected Area Name	Reserve Type	Coastal Component	Planning Area	
			Bass	Otway
Perkins Island	Conservation Area	✓	X	-
Petrel Islands	Game Reserve	✓	✓	-
Pieman River	State Reserve	✓	✓	✓
Porky Beach	Conservation Area	✓	-	✓
Preminghana	Indigenous Protected Area	✓	✓	✓
Prime Seal Island	Conservation Area	✓	✓	-
Rebecca Creek	Conservation Area	-	-	X
Red Hut Point	Conservation Area	✓	✓	✓
Red Hut Road #1	Conservation Covenant	-	✓	✓
Red Hut Road #2	Conservation Covenant	-	✓	✓
Reedy Lagoon	Private Nature Reserve	-	✓	-
Reekara Road #1	Conservation Covenant	-	-	✓
Reekara Road #2	Conservation Covenant	-	-	✓
Reid Rocks	Nature Reserve	✓	✓	✓
Rocky Cape	National Park	✓	X	-
Rodondo Island	Nature Reserve	✓	✓	✓
Roydon Island	Conservation Area	✓	✓	-
Sartoris Rd Nugara	Conservation Covenant	-	-	✓
Sea Elephant	Conservation Area	✓	✓	✓
Sea Elephant Bootlace	Conservation Covenant	-	X	✓
Sea Elephant River	Conservation Covenant	-	X	✓
Seacrow Islet	Conservation Area	✓	✓	✓
Seal Rocks	Conservation Area	-	X	✓
	State Reserve	✓	X	✓
Sentinel Island	Conservation Area	✓	✓	-
Settlement Point	Conservation Area	✓	✓	-
Sister Islands	Conservation Area	✓	✓	-
Slaves Bay	Conservation Area	✓	✓	✓
South Pats River	Conservation Area	-	X	-
South Rd Nugara	Conservation Covenant	-	-	✓
Southwest	Conservation Area	✓	✓	✓
	National Park	✓	✓	✓
Spike Island	Conservation Area	✓	✓	-

Protected Area Name	Reserve Type	Coastal Component	Planning Area	
			Bass	Otway
Stack Island	Game Reserve	✓	✓	X
Stanley	Conservation Area	✓	✓	-
Stokes Point	Conservation Area	✓	✓	✓
Strahan Customs House	Historic Site	-	X	X
Strzelecki	National Park	✓	✓	-
Sugarloaf Rock	Conservation Area	✓	✓	✓
Sundown Point	State Reserve	✓	✓	✓
Sydney Cove	Historic Site	✓	✓	-
Table Cape	Conservation Area	✓	X	-
	State Reserve	✓	X	-
Tambar	Conservation Covenant	-	-	✓
Tathams Lagoon	Conservation Area	-	-	✓
Tatlows Beach	Conservation Area	✓	✓	-
Teepookana	Regional Reserve	-	✓	X
Temma	Conservation Covenant	-	-	X
Tenth Island	Nature Reserve	✓	X	-
The Dock	Conservation Covenant	-	✓	-
The Doughboys	Nature Reserve	✓	✓	✓
The Nut	State Reserve	✓	✓	-
Three Hummock Island	State Reserve	✓	✓	✓
Three Sisters-Goat Island	Nature Reserve	✓	X	-
Tikkawoppa Plateau	Regional Reserve	-	X	✓
Tin Mine Rd Loorana	Conservation Covenant	-	-	✓
Trial Harbour	State Reserve	✓	✓	✓
Trousers Point Beach	Conservation Area	✓	✓	-
Tully River	Conservation Area	-	X	X
Wallaby Islands	Conservation Area	✓	✓	-
Warra Creek	Regional Reserve	-	X	X
Welcome River	State Reserve	✓	✓	X
Welcome Swamp	Conservation Covenant	-	-	X
West Coast Range	Regional Reserve	-	✓	-
West Moncoeur Island	Nature Reserve	✓	✓	✓
West Point	State Reserve	✓	✓	✓

Protected Area Name	Reserve Type	Coastal Component	Planning Area	
			Bass	Otway
Wicks Road Nugara	Conservation Covenant	-	-	✓
Wingaroo	Nature Reserve	-	✓	-
Wright Rock	Nature Reserve	✓	✓	-
Wybalenna Island	Conservation Area	✓	✓	-
Yambacoona	Conservation Covenant	-	X	✓

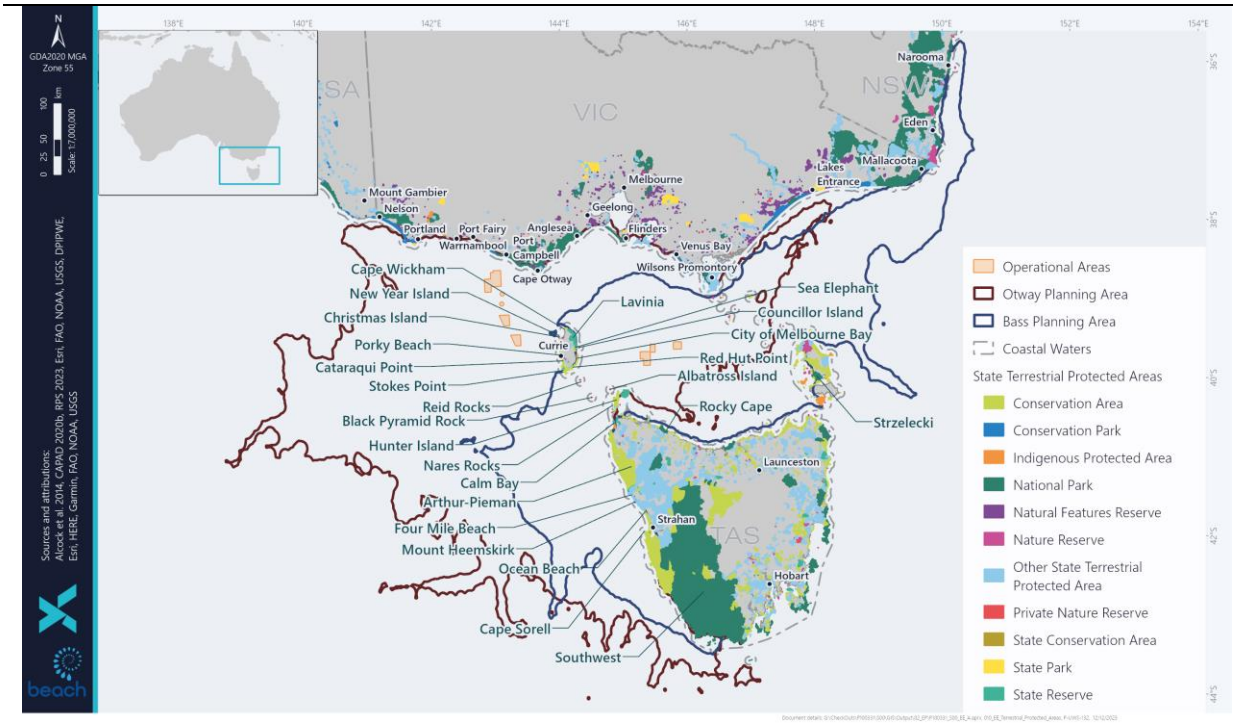


Figure 6-10: State Terrestrial Protected Areas within the Planning Areas - Tasmania

6.2.11.1 Albatross Island Nature Reserve

Albatross Island Nature Reserve covers 33 ha off the north-west coast of Tasmania (BirdLife International 2023). The island is habitat critical to the survival of the shy albatross. Albatross Island and the adjacent Black Pyramid Rock support approximately 40% of the global population of shy albatross and approximately 20% of the global population of Australasian gannet, as well as significant numbers of fairy prion and common diving-petrel (BirdLife International 2023).

6.2.11.2 Arthur-Pieman Conservation Area

The Arthur-Pieman Conservation Area covers 102,982 ha along the north-west coast of Tasmania at the mouth of the Arthur River, containing extensive peatlands and large dune fields. The Arthur-Pieman Conservation Area is managed under the Arthur-Pieman Conservation Area Management Plan (PWS 2002).

The area provides important habitat for many bird species including the orange-bellied parrot, hooded plovers, white-bellied sea eagles, fairy terns and pacific gulls.

The Arthur–Pieman Conservation Area has been described as '...one of the world's great archaeological regions' by the Australian Heritage Commission (PWS 2002). In recent years there has been concerns in relation to impacts from 4wd tracks on indigenous places and heritage objects within the conservation area (DPIPWE 2021a).

6.2.11.3 Black Pyramid Rock Nature Reserve

Black Pyramid Rock Nature Reserve covers 14.47 ha on the basaltic rock island. The island is part of the Hunter Island Group between King Island and north-west Tasmania. The reserve is also part of the Albatross Island and Black Pyramid Rock Important Bird Area recognised by BirdLife Australia (BirdLife International 2023). The Important Bird Area provides habitat for many species including Little penguins, short-tailed shearwaters, Pacific and silver gulls. Black Pyramid Rock Nature Reserve is the only documented breeding site for the Australasian gannet in the Bass Strait and one of only eight breeding sites within Australia (PWS 2000).

6.2.11.4 Calm Bay State Reserve

Calm Bay State Reserve covers 321.19 ha within Circular Head at the north-west of Tasmania. There is no management plan for the Calm Bay State Reserve.

6.2.11.5 Cape Sorell Historic Site

Cape Sorell Historic Site covers 69.63 ha of headland along the West Coast of Tasmania. The heritage-listed Cape Sorell Lighthouse is located within the site. No management plan is available for the Cape Sorell Historic Site.

6.2.11.6 Cape Wickham Conservation Area/State Reserve

The Cape Wickham Conservation Area and State Reserve protect 85.04 and 2.56 ha, respectively, on the northern tip of King Island and contains Cape Wickham lighthouse and the gravesites of the crew of Loch Leven, a ship that was wrecked nearby. These features are outside of the Planning Area. It is designated as IUCN Category V which is a protected landscape/seascape. There is no management plan in place.

6.2.11.7 Cataraqui Point Conservation Area

Cataraqui Point Conservation Area is located on the west coast of King Island covering an area of 275.8 ha and extending from the coast to 100-200 m inland. The conservation area is designated as IUCN Category V and there is no management plan in place.

6.2.11.8 Christmas Island Nature Reserve

Christmas Island Nature Reserve covers 84.24 ha surrounding the granite island to the north-west of King Island. The reserve is part of the King Island Important Bird Area recognised by BirdLife Australia for providing important habitat for the orange-bellied parrot during its migration as well as significant numbers of short-tailed shearwater, black-faced cormorant, fairy tern, hooded plover, and Pacific gull (BirdLife Australia 2023b).

6.2.11.9 City of Melbourne Bay Conservation Area

City of Melbourne Bay Conservation Area covers 201.03 ha on King Island. The conservation area is designated as IUCN Category V and there is no management plan in place.

6.2.11.10 Councillor Island Nature Reserve

Councillor Island Nature Reserve covers 17.58 ha of the granite island within the New Year Group. The reserve is part of the King Island Important Bird Area recognised by BirdLife Australia for providing important habitat for the orange-bellied parrot during its migration as well as significant numbers of short-tailed shearwater, black-faced cormorant, fairy tern, hooded plover and Pacific gull (BirdLife International 2023c). The conservation area is designated as IUCN Category I and there is no management plan in place.

6.2.11.11 Four Mile Beach Regional Reserve

Four Mile Beach Regional Reserve covers 3,280.45 ha along the west coast of Tasmania. The reserve is designated as IUCN Category VI and there is no management plan in place.

6.2.11.12 Hunter Island Conservation Area

Hunter Island Conservation Area covers 7,330.41 ha between King Island and north-west Tasmania. Hunter Island is the main island of the Hunter Island Group which is also an Important Bird Area recognised by BirdLife Australia as supporting the orange-bellied parrot, short-tailed shearwater, black-faced cormorant, and pacific gull (BirdLife International 2023a).

6.2.11.13 Lavinia State Reserve

Lavinia State Reserve covers 7,860.4 ha on King Island at the Lavinia Ramsar Site. See Section 6.2.6.2.

6.2.11.14 Mount Heemskirk Regional Reserve

Mount Heemskirk Regional Reserve covers 16,737.11 ha along the west coast of Tasmania. The reserve is designated as IUCN Category VI and there is no management plan in place.

6.2.11.15 Nares Rocks Conservation Area

Nares Rocks Conservation Area covers 3.06 ha in the Hunter Island Group between King Island and north-west Tasmania. Breeding activity has been recorded in the area for significant species including the common diving-petrel, pacific gull, silver gull and black-faced cormorant (Brothers et al. 2001).

6.2.11.16 New Year Island Game Reserve

New Year Island Game Reserve covers 118.22 ha to the north-west of King Island. The reserve is part of the King Island Important Bird Area recognised by BirdLife Australia for providing important habitat for the orange-bellied parrot during its migration as well as significant numbers of short-tailed shearwater, black-faced cormorant, fairy tern, hooded plover and pacific gull (BirdLife Australia 2023c).

6.2.11.17 Ocean Beach Conservation Area

Ocean Beach Conservation Area covers 6,192.8 ha along the west coast of Tasmania. The conservation area is an IUCN category V and there is no management plan in place.

6.2.11.18 Porky Beach Conservation Area

Porky Beach Conservation Area is located on the west coast of King Island covering an area of 339.8 ha and extending from the coast to 100-200 m inland. The conservation area is designated as IUCN Category V and there is no management plan in place.

6.2.11.19 Red Hut Point Conservation Area

Red Hut Point Conservation Area covers an area of 159.84 ha on King Island. The conservation area is designated as IUCN Category V and there is no management plan in place.

6.2.11.20 Reid Rocks Nature Reserve

Reid Rocks Nature Reserve covers 6.62 ha in the New Year Island Group. It is the only breeding site in Tasmania for Australian fur-seals (PWS 2000).

6.2.11.21 Rocky Cape National Park

The Rocky Cape National Park protects 3,096 ha along the north coast of Tasmania. The national park protects a range of habitat from coastline to rolling hills of heathland. Conservation significant flora species, such as *Xanthorrhoea arenaria* are present throughout the park. The vegetation and landforms throughout the park support a range of conservation significant fauna, like the Tasmanian devil and spotted quoll. Recreational values within the park include swimming, snorkelling, fishing, and bushwalking. Evidence of First Nations occupation is present throughout the park, including vast cave middens (TASPAWS 2023).

6.2.11.22 Sea Elephant Conservation Area

Sea Elephant Conservation Area covers 722.06 ha on King Island, approximately 25 km north-east of Currie. The conservation area is designated as IUCN Category VI and there is no management plan in place.

6.2.11.23 Seal Rocks Conservation Area/State Reserve

Seal Rocks Conservation Area and State Reserve protects 458.07 and 583.54 ha, respectively, on the southwestern coast of King Island. The state reserve is an IUCN category III and there is no management plan in place.

6.2.11.24 Southwest Conservation Area and National Park

The Southwest Conservation Area and National Park protect approximately 789,000 ha of land in the southwest corner of Tasmania. Southwest National Park is Tasmania's largest National Park. The parks are part of the Tasmanian Wilderness World Heritage Area discussed in Section 6.2.1.1. Habitats that are found within the parks include mountain ranges, rocky coastlines, deep harbours, extensive plains, and undisturbed forests. The settlement of Melaleuca is located within the national park and is one of few places where the orange-bellied parrot breeds. Further species of conservation significance that are supported within the area include the short-tailed shearwater, the hooded plover and the Port Davey skate who can be found in the Bathurst Channel. Visitors can participate in a variety of nature-based activities including fishing, caving, camping, boating, snorkelling, and swimming. Further the South Coast Track is located within the national park and is a multi-day hike along the southern Tasmanian coast. There is a rich First Nations heritage within the national park. Midden sites, artefact scatters, hut depressions and rock shelters all provide links to the people that have lived on the land of the national park for over 35,000 years (TASPAWS 2022)

6.2.11.25 Stokes Point Conservation Area

Stokes Conservation Area is a 233.1 ha area on the south-western coast of King Island. The state reserve is an IUCN category V and there is no management plan in place.

6.2.11.26 Strzlecki National Park

The Strzlecki National Park protects 4,216 ha and is in the south-western corner of Flinders Island in the Bass Strait. It is managed under the Strzlecki National Park Management Plan (PWS 2000a). The park protects a range of ecosystems from coastline to mountain landscapes. It is of biogeographic significance as it contains elements of both Tasmanian and mainland Australian flora and fauna. Further there is considerable scientific interest due to the high number of endemic species, rare flora and fauna, and significant vegetation communities. The national park is a major attraction for visitors to Flinders Island and contributes significantly to the island's tourism sector. Visitors can participate in recreational activities like camping, bushwalking, nature studies, and scenic diving. There is considerable evidence of First Nations occupation of Flinders Island and several sites have been recorded within the national park. Sites recorded include sell middens, cove deposit and artefact scatters (PWS 2000a)

6.2.11.27 Sundown Point State Reserve

Sundown Point State Reserve covers 149.4 ha and is within the Arthur-Pieman Conservation Area (see Section 6.2.11.2).

6.2.11.28 Sydney Cove Historic Site

Sydney Cove is the eight oldest shipwreck in Australian waters and the historic site protects 61.08 ha.

6.2.11.29 The Doughboys Nature Reserve

The Doughboys Nature Reserve covers 19.98 ha at the Doughboy Islands (Koindrim) as part of the Trefoil Island Group off the north-west of Tasmania. The Doughboys are part of the Hunter Island Group Important Bird Area, recognised by BirdLife Australia as supporting the orange-bellied parrot, short-tailed shearwater, black-faced cormorant, and pacific gull (BirdLife International 2023a).

6.2.11.30 The Nut State Reserve

The Nut State Reserve protects 67.68 ha and is managed under the Nut State Reserve Management Plan 2003 (PWS 2003). The Nut rises to 143 m and is almost completely ringed by sheer cliffs falling to the sea. It is a tourism icon for the north-west region and one of the most well known landforms in Tasmania (PWS 2003).

The reserve is a significant breeding site for short-tailed shearwaters, Australian kestrels, and little penguins. Significant Aboriginal and historic heritage sites exist within the reserve (PWS 2003).

6.2.11.31 Trial Harbour State Reserve

Trial Harbour State Reserve covers 0.71 ha along the west coast of Tasmania. The state reserve is an IUCN category III, aimed to protect a natural monument or feature.

6.2.11.32 West Point State Reserve

West Point State Reserve is a 557.08 ha area on the northwest coast of Tasmania. The state reserve is an IUCN category V and there is no management plan in place.

6.2.12 South Australian Protected Areas – Marine

Lower South East Marine Park was identified in the PMST Reports (Appendix E) as being intersected by the Planning Area due to the size of the grids used in the PMST. As shown in Figure 6-8 no South Australian marine parks are within the Planning Area.

6.2.13 New South Wales Protected Areas – Marine

New South Wales marine protected areas intersecting the planning areas are presented in Table 6-11 and Figure 6-9 (PMST Report Appendix E).

Table 6-11: New South Wales Marine Protected Areas Intersecting the Planning Areas

Protected Area Name	Reserve Type	Planning Area	
		Bass	Otway
Batemans	Marine Park	✓	-

6.2.13.1 Batemans Marine Park

Batemans Marine Park covers approximately 850 ha. The marine park extends from Murramarang Beach to Wallage Lake and includes the Tollgate and Montague Islands. A key natural feature of Batemans Marine Park are large expanses of rocky reef, which support a variety of marine fauna. The Montague Island Nature Reserve is located within the Batemans Marine Park. This Nature reserve supports a breeding place for over 40,000 seabirds, a haul-out site for Australian and New Zealand fur seals, a nesting place for three shearwaters, crested terns and silver gulls, and is a nesting place for the little penguin (DPI NSW 2023). The Batemans Marine Park is managed under the Batemans Marine Park Operational Plan (Marine Parks Authority 2010). The plan identifies the key natural, cultural, and economic values of the park as:

- Contains 24 estuaries and frequent nutrient rich upwelling events.
- Shallow rocky reefs dominated by lush kelp forests which support hundreds of invertebrate species and a diverse array of fish species.
- Deeper rocky reefs host sponges, ascidians and sea whips as well as over 78 species of fish.
- Abundant seagrass beds which enhance primary production and biodiversity, stabilize sediment, and provide a nursery habitat for crustaceans and fish.
- Unconsolidated habitats support infauna species including crustaceans, gastropods, and polychaete worms.
- Resident and migratory species of particular conservation importance within the park include grey nurse and white sharks, eastern blue devil fish, black cod, weedy sea dragons, Australian and New Zealand fur-seals, as well as humpback, southern right and killer whales.
- A number of seabird and shorebirds have been recorded nesting or foraging within the park.
- Many sites and objects of significance to the Yuin (*Dharumba, Djirringanj*, *Brinja* and Walbanga).

- More than 10 shipwrecks including the John Penn and the Lady Darling.
- Commercial and recreational tourism including swimming, fishing, surfing, snorkelling, diving, sailing, kayaking and whale watching.

6.2.14 New South Wales Protected Areas – Terrestrial

New South Wales terrestrial protected areas identified in the PMST Reports (Appendix E) are presented in Table 6-12 and Figure 6-11. Areas identified in the PMST Report due to the size of the grids used in the PMST but not actually intersecting a Planning Area are listed in the Table with 'X'. New South Wales terrestrial protected areas which intersect a Planning Area and have a coastal component which may be exposed to hydrocarbons by a spill event are discussed in the subsections below, where information is available.

Table 6-12: New South Wales Terrestrial Protected Areas Intersecting the Planning Areas

Protected Area Name	Reserve Type	Coastal Component	Planning Area	
			Bass	Otway
Ben Boyd	National Park	✓	✓	-
Bermaguee	Nature Reserve	-	X	-
Bermagui	Flora Reserve	-	X	-
Biamanga	National Park	✓	✓	-
Eurobodalla	National Park	✓	✓	-
Gulaga	National Park	-	X	-
Mimosa Rocks	National Park	✓	✓	-
Montague Island	Nature Reserve	✓	✓	-
Mumbulla	Flora Reserve	-	X	-
Murrah	Flora Reserve	-	X	-
Nadgee	Nature Reserve	✓	✓	-

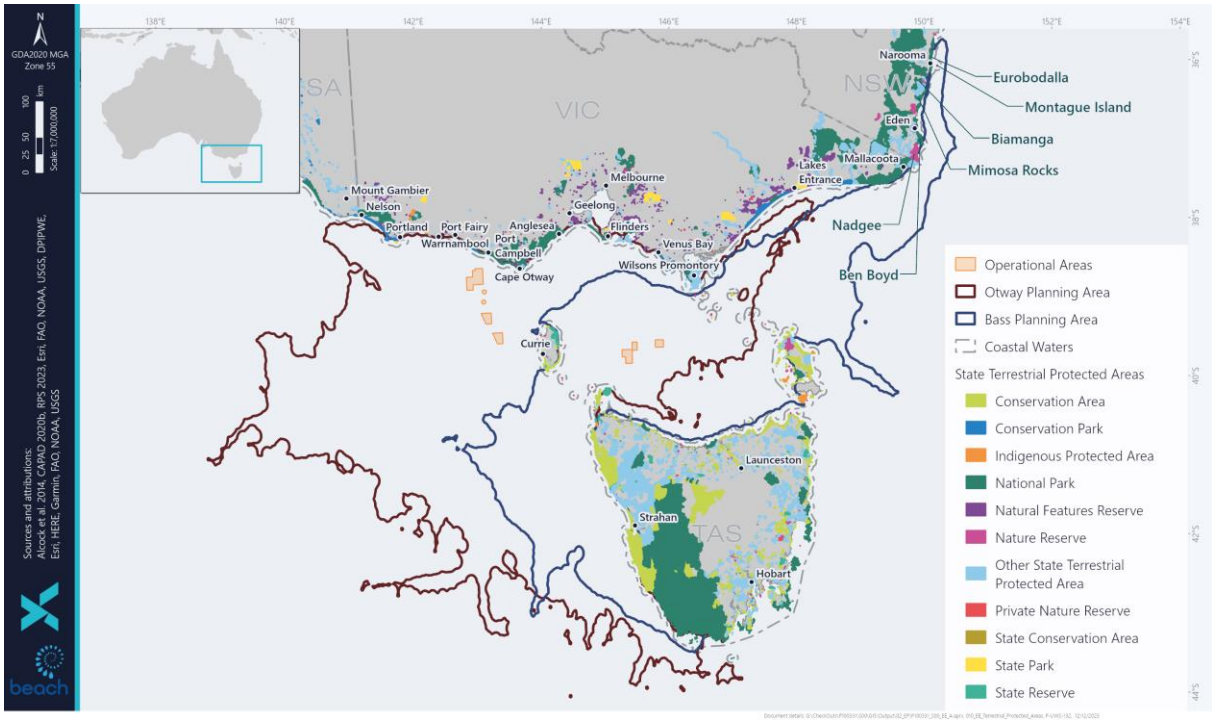


Figure 6-11: State Terrestrial Protected Areas within the Planning Areas – New South Wales

6.2.14.1 Ben Boyd National Park

The Ben Boyd National Park (Beowa National Park) protects around 10,500 ha and is managed under the Ben Boyd National Park and Bell Bird Creek Nature Reserve Plan of Management (NPWS 2021). It spans 47 km of rocky coastline and sheltered inlets. Unique features of the park include the contrast between the folded red rock platforms and ocean water. Species of significance known to visit the water surrounding the National Park include the humpback whale and the southern right whale. Recreation activities undertaken at the park include bush walking, swimming, the Green Cape light station, and whale watching. More than 50 First Nations sites have been recorded within the national park, including middens, rock shelters, campsites, and long-distance travel routes (NPWS 2021)

6.2.14.2 Biamanga National Park

The Biamanga National Park covers approximately 13,750 ha and is managed under the Plan of Management Yuin Bangguri (Mountain) Parks (NPWS 2014). Much of the national park is situated above the high-water mark, however a segment of shoreline at Baragoot Beach is included. The national park contains many unique flora and vegetation associations and provides vital habitat for numerous fauna species. The land within the national park is traditionally associated with the Yuin people of NSW. There are many significant First Nations sites found within the national park that hold spiritual significance for the Yuin people (NPWS 2014).

6.2.14.3 Eurobodalla National Park

The Eurobodalla National Park covers approximately 2,200 ha and is managed under the Eurobodalla National Park Plan of Management (NPWS 2000). The national park contains a 30 km long section of coastline. A total of 12 different vegetation associations are present throughout the national park. These associations support an estimated 194 different fauna species including conservation significant mammals. Several migratory bird species use Eurobodalla as important north-south linking habitat

including the large sand plover and the black-tailed godwit. Recreational values of the park include camping, fishing, swimming, and hiking. The national park is located on the traditional lands of the Yuin People of NSW. 85 registered Aboriginal sites are known from the national park and its surrounds including middens, camp sites, quarried, artefact scatters, burial sites, and fish traps (NPWS 2000).

6.2.14.4 Mimosa Rocks National Park

Mimosa Rocks National Park covers 5,700 ha on the far south NSW coast and is managed under the Mimosa Rocks National Park Plan of Management (NPWS 2011). The dunes and cliffs within the national park support specialised vegetation associations capable of withstanding high salinity and coastal winds, including coastal banksia, coastal wattle and drooping she-oak. Conservation significant fauna supported by this unique vegetation include the hooded plover, bar-tailed godwit, and a variety of migratory seabirds. The name of the national park stems from the paddle steamer *Mimosa* which wrecked on the rocks in 1863. Recreational activities within the park include swimming, camping, and hiking. The land within the national park is traditionally associated with the Yuin people of NSW (NPWS 2023).

6.2.14.5 Montague Island Nature Reserve

Montague Island Nature reserve is included within the Batemans Marine Park, described further in Section 6.2.13.1, and is subject to the Barunguba Montague Island Nature Reserve Draft Plan of Management (DPE 2023). The reserve provides important habitat for nesting seabirds including little penguins, short-tailed shearwaters, wedge-tailed shearwaters, greater crested terns, Gould's petrels and silver gulls. The reserve is also the largest aggregation of fur-seals on the NSW coast and the most northerly breeding site on the east coast of Australia (DPE 2023). Australian and long-nosed fur-seals utilise the area for haul-out and breeding. The island is recognised as a significant ceremonial area and resource gathering place to Aboriginal peoples, namely the Yuin People. Public visitation is limited to commercial tours.

6.2.14.6 Nadgee Nature Reserve

The Nadgee Nature Reserve protects 20,671 ha from the south coast of NSW to East Gippsland in Victoria and is subject to the Nadgee Nature Reserve Plan of Management (NPWS 2003). The main habitats protected include the coastal range, coastal plain, estuaries, beaches, cliffs, dunes and other coastal landforms. The reserve has been relatively undisturbed since European settlement, has a large number of rare and threatened plant and animal species and has the only coastal wilderness area in NSW. Recreation values include bushwalking, birdwatching, and swimming. The land within the nature reserve is traditionally associated with the Bidamal people of NSW and has been shared with the Dtharwa and Monaroo peoples. Evidence of traditional use has been identified by the presence of middens along the shoreline (NPWS 2003).

6.2.15 Key Ecological Features

Key Ecological Features (KEFs) are elements of the marine environment, based on current scientific understanding, and are considered to be of regional importance for either the region's biodiversity or ecosystem function and integrity of a Commonwealth Marine Area.

KEFs identified in the PMST Reports (Appendix E) are presented in Table 6-13 and Figure 6-12 and described in the subsections below.

Table 6-13 Key Ecological Features within the Planning Areas

Key Ecological Feature	Operational Area		Planning Area	
	Bass	Otway	Bass	Otway
Big Horseshoe Canyon	-	-	✓	-
Bonney Coast Upwelling	-	-	-	✓
Seamounts South and East of Tasmania	-	-	-	✓
Shelf Rocky Reefs	-	-	✓	-
Upwelling East of Eden	-	-	✓	✓
West Tasmania Canyons	-	✓	✓	✓

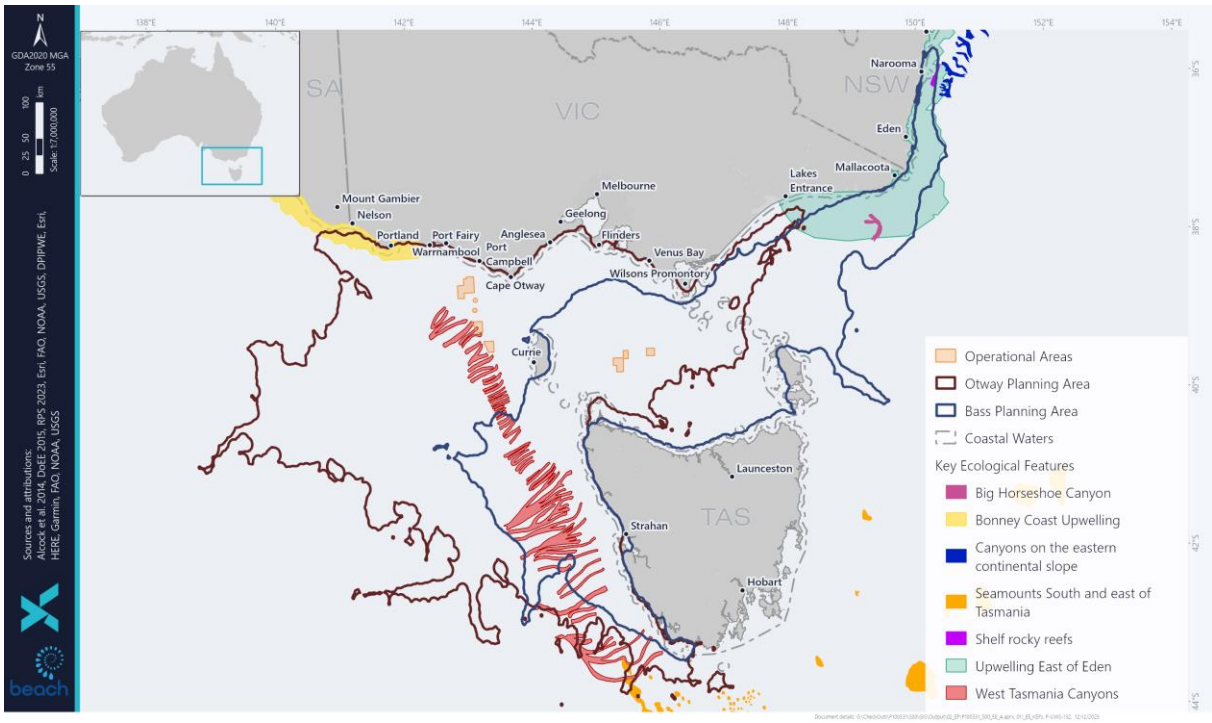


Figure 6-12: Key Ecological Features within the Operational and Planning Areas

6.2.15.1 Big Horseshoe Canyon

Big Horseshoe Canyon lies south of the coast of eastern Victoria and is the easternmost arm of the Bass canyon system. The steep, rocky slopes provide hard substrate habitat for attached large megafauna. Big Horseshoe Canyon is defined as a KEF as it is an area of high productivity and aggregations of marine life (DCCEEW 2023d). Canyons have a marked influence on diversity and abundance of species through their combined effects of topography, geology, and localised currents, all of which act to funnel nutrients and sediments into the canyon. Sponges and other habitat forming species provide structural refuges for benthic fish, including the commercially important pink ling (*Genypterus blacodes*) and the only known temperate location of the stalked crinoid (*Metacrinus cyaneu*), which occurs in water depths between 200 m and 300 m (DCCEEW 2023d).

6.2.15.2 Bonney Coast Upwelling

The Bonney Coast upwelling is a predictable, seasonal upwelling bringing cold nutrient rich water to the sea surface and supporting regionally high productivity and high species diversity in an area where such sites are relatively rare and mostly of smaller scale (DCCEEW 2023g). The Bonney Coast upwelling is defined as a key ecological feature as it is an area of enhanced pelagic productivity and has high aggregations of marine life (DCCEEW 2023g). In addition to whales, many endangered and listed species frequent the area, possibly also relying on the abundance of krill that provide a food source to many seabirds and fish. The high productivity of the Bonney coast upwelling is also capitalised on by other higher predator species such as little penguins and Australian fur seals feeding on baitfish (CoA 2015c). Further detail about the Bonney Coast upwelling is provided in Section 6.3.6.

The Bonney Coast Upwelling KEF lies on the continental shelf situated ~120 km northwest of Cape Jaffa, South Australia to Portland, Victoria (Figure 6-12). The location of the Bonney Coast Upwelling KEF was originally derived through a review of enhanced chlorophyll occurrence for summer seasonal data between the years of 1998 and 2010 (Research Data Australia 2013).

The Bonney Coast Upwelling KEF is situated ~67 km to the west of the Otway Operational Area (Figure 6-12).

6.2.15.3 Seamounts South and East of Tasmania

The Seamounts South and East of Tasmania are defined as a KEF as they are considered an area of high productivity which results in increased aggregations of marine life and increasing biodiversity. They are clusters of seamounts rising from the abyssal plain, continental rise or plateau situated 200 km or more from the Tasmanian coast (DCCEEW 2023f). As geological features, seamounts provide variable habitat for many species. Some summits and slopes will have hard substrate which can provide attachment points for sessile invertebrates, while soft sediment supports burrowing species (DCCEEW 2023f). Further, seamounts can sometimes influence and intensify currents, creating localised upwelling and turbulent mixing. Accelerated water flows are thought to create upwellings of nutrient rich waters from the seafloor (DCCEEW 2023f).

6.2.15.4 Shelf Rocky Reefs

Rocky reefs and hard grounds are located in all areas of the South-east Marine Region continental shelf including the Bass Strait, from the sub-tidal zone to the continental shelf break. The continental shelf break generally occurs in 50 m to 150–220 m water depth. The shallowest depth at which the rocky reefs occur in Commonwealth waters is approximately 50 m.

On the continental shelf, rocky reefs and hard grounds provide attachment sites for macroalgae and sessile invertebrates, increasing the structural diversity of shelf ecosystems. The reefs provide habitat and shelter for fish and are important for aggregations of biodiversity and enhanced productivity.

The shelf rocky reefs and hard substrates are defined as a key ecological feature as they are an area of high productivity and aggregations of marine life. This KEF has not yet been spatially defined (CoA 2015a).

6.2.15.5 Upwelling East of Eden

The Upwelling East of Eden is defined as a KEF due to its high productivity and aggregations of marine life. The upwelling is influenced by dynamic eddies of the east Australian current which cause episodic

productivity events when they interact with the continental shelf and headlands. The episodic mixing of nutrient enrichment events drive phytoplankton blooms that are the basis of productive food chains including zooplankton, copepods, krill and small pelagic fish (DCCEEW 2023e). The upwelling of this region on the eastern Victorian coast and southern NSW coast occurs more of less continuously from austral spring to autumn (Huang and Wand 2019). However, there is strong temporal (i.e., month to month, seasonal and inter-annual) variability of the upwelling characteristics and area of influence (Huang and Wang 2019).

The upwelling supports regionally high primary productivity which in turn support fisheries and biodiversity, including top order predators, marine mammals, and seabirds. This area is one of two feeding areas for blue whales and humpback whales, known to arrive when significant krill aggregations form. The area is also important for other cetaceans, seals, sharks, and seabirds (DCCEEW 2023e)

6.2.15.6 West Tasmania Canyons

The West Tasmania Canyons are located on the relatively narrow and steep continental slope west of Tasmania. This location has the greatest density of canyons within Australian waters where 72 submarine canyons have incised a 500 km-long section of slope (Heap & Harris 2008). The canyons in the Zeehan AMP are relatively small on a regional basis, each less than 2.5 km wide and with an average area of 34 km^2 shallower than 1,500 m (Williams et al. 2009). The Zeehan canyons are typically gently sloping and mud-filled with less exposed rocky bottoms compared with other canyons in the South-east Marine Region (e.g. Big Horseshoe Canyon).

Submarine canyons modify local circulation patterns by interrupting, accelerating, or redirecting current flows that are generally parallel with depth contours. Their size, complexity and configuration of features determine the degree to which the currents are modified and therefore their influences on local nutrients, prey, dispersal of eggs, larvae and juveniles and benthic diversity with subsequent effects which extend up the food chain.

Eight submarine canyons surveyed in Tasmania, Australia, by Williams et al. (2009) displayed depth-related patterns with regard to benthic fauna, in which the percentage occurrence of faunal coverage visible in underwater video peaked at 200-300 m water depth, with averages of over 40% faunal coverage. Coverage was reduced to less than 10% below 400 m depth. Species present consisted of low-relief bryozoan thicket and diverse sponge communities containing rare but small species in 150 to 300 m water depth.

Sponges are concentrated near the canyon heads, with the greatest diversity between 200 m and 350 m depth. Sponges are associated with abundance of fishes and the canyons support a diversity of sponges comparable to that of seamounts (CoA 2015a).

6.3 Physical Environment

6.3.1 Metocean Conditions

6.3.1.1 Climate

The area is typical of a cool temperate region with cold, wet winters and warm dry summers. The regional climate is dominated by sub-tropical high-pressure systems in summer and sub-polar low pressure systems in winter. The conditions are primarily influenced by weather patterns originating in the Southern Ocean. The low-pressure systems are accompanied by strong westerly winds and rain-

bearing cold fronts that move from south-west to north-east across the region, producing strong winds from the west, north-west and south-west.

The day-to-day variation in weather conditions is caused by the continual movement of the highs from west to east across the Australian continent roughly once every 10 days.

6.3.1.2 Winds

Bass Strait is located on the northern edge of the westerly wind belt known as the Roaring Forties. In winter, when the subtropical ridge moves northwards over the Australian continent, cold fronts generally create sustained west to south-westerly winds and frequent rainfall in the region (McInnes and Hubbert 2003). In summer, frontal systems are often shallower and occur between two ridges of high pressure, bringing more variable winds and rainfall.

Wind data for the Otway Basin from RPS (2022) demonstrated average monthly wind speeds ranging from 14.2 knots (January) to 20.1 knots (July) with maximums ranging between 58.9 knots (February) and 65.8 knots (December. The dominant wind direction throughout the year was from the west, whilst maximum wind speeds were typically associated with westerly winds during all months of the year.

Wind data from the Bass basin from RPS (2023) demonstrated average monthly wind speeds ranging from 15.5 knots (January) to 19.6 knots (July) with maximums oscillating between 39.1 knots (January) and 50.2 knots (July). The wind direction between November to March was generally southwest and northeast, while the winds were mostly blowing from the west during May to October.

6.3.1.3 Tides

Tides are semi-diurnal with some diurnal inequalities (Jones and Padman 1983), generating tidal currents along a north-east/south-west axis, with speeds generally ranging from 0.1 to 2.5 m/s (Fandry 1983). The maximum range of spring tides in western Bass Strait is approximately 1.2 m. Sea level variation in the area can arise from storm surges and wave set up (Santos 2004).

6.3.1.4 Ocean Currents

The East Australian Current is one of the four major currents known to heavily influence on the conditions and biodiversity in Australian oceans and coastal environments. There are also a number of smaller and more complex current systems. All these ocean features can change from season to season, and may be more or less extensive and energetic, depending on climate factors.

Ocean currents in Bass Strait are primarily driven by tides, winds and density-driven flows (Figure 6-13). During winter, the South Australian current moves dense, salty warmer water eastward from the Great Australian Bight into the western margin of the Bass Straight. In winter and spring, waters within the straight are well mixed with no obvious stratification, while during summer the central regions of the straight become stratified.

Furthermore, during winter, the Bass Strait cascade occurs, a wintertime downwelling caused by cooling of the shallow waters of Bass Strait in the Gippsland Basin. Downwelling currents that originate in the shallow eastern waters of Bass Strait flow down the continental slope to depths of several hundred meters or more into the Tasman Sea. Lateral flushing within the strait results from inflows from the South Australian Current, East Australian Current, and sub-Antarctic surface waters. The

importance of this phenomenon is recognised through the designation of the seasonal Bass Cascade Key Ecological Feature.

Surface currents within the permit area have been modelled by combining the HYDROMAP tidal currents and HYCOM ocean currents for 2009 – 2013 inclusive to produce monthly surface currents. These show a rotational aspect because of inflow and outflow to Bass Strait. Although unimodal the currents are stronger from the west in all months excepting February when the currents from the east are the strongest. Minimum currents have been derived as 0.2-0.4 m/s and maximum currents as 0.8-2.0 m/s, with the strongest currents during the months July to October.

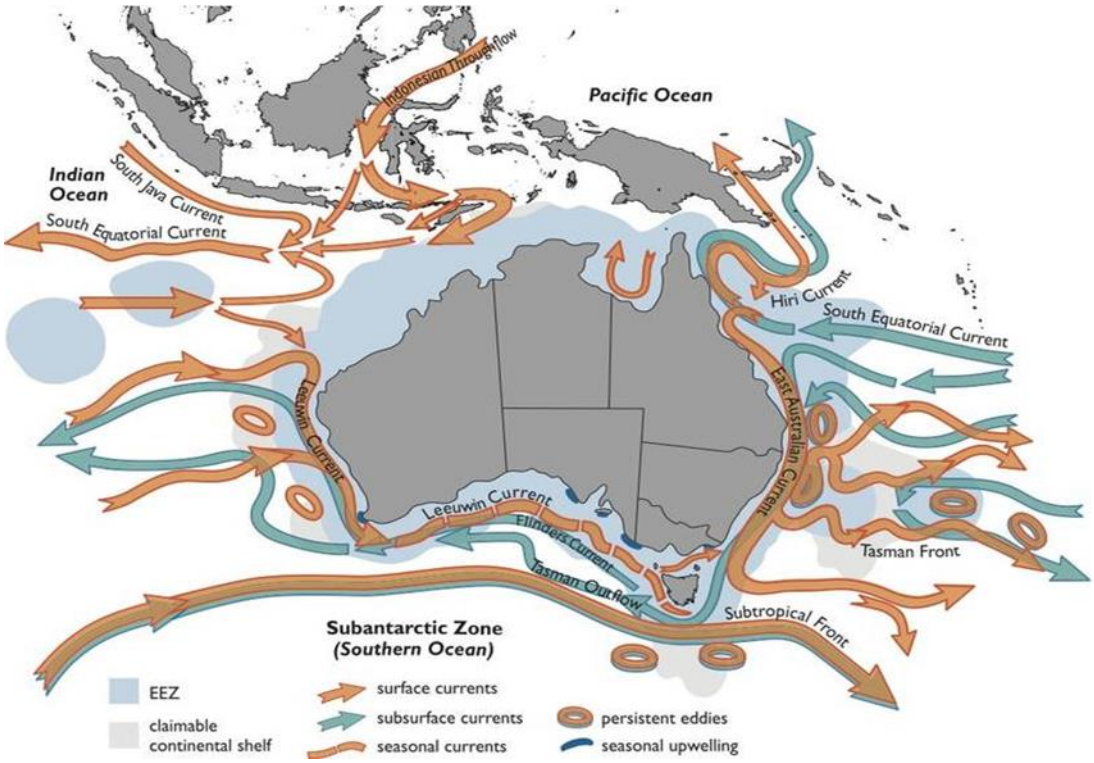


Figure 6-13: Australian Ocean Currents

6.3.1.5 Waves

Bass Strait is a high-energy environment exposed to frequent storms and significant wave heights. The Otway coast has a predominantly south-westerly aspect and is highly exposed to swell from the Southern Ocean.

There are two principal sources of wave energy in the Otway Basin:

- From the westerly swell from the Great Australian Bight and Southern Ocean.
- From locally generated winds, generally from the west and east.

The Otway area is fully exposed to long period 13 second average south-westerly swell from the Southern Ocean as well as periodic shorter 8 second average period waves from the east. Wave heights from these winds generally range from 1.5 m to 2 m, although waves heights to 10 m can occur during storm events and a combination of wind forcing against tidal currents can cause greater

turbulence. The largest waves are associated with eastward-moving low pressure and frontal systems that cross the site every 4 to 6 days in winter.

6.3.1.6 Sea Temperature

The waters have average surface temperatures ranging from 14°C in winter to 21°C in summer. However, subductions of cooler nutrient-rich water (upwellings) occur along the seafloor during mid to late summer, though this is usually masked in satellite images by a warmer surface layer.

The upwelled water is an extension of the regional Bonney coast upwelling system, which affects southern Australia because of south-east winds forcing surface water offshore thus triggering a compensatory subduction along the bottom. If the wind is strong enough the water sometimes shoals against the coast. The water originates from a subsurface water flow called the Flinders current and has the characteristics of reheated Antarctic Intermediate Water (Levings and Gill 2010).

During winter and spring onshore winds cycling from the southwest to northwest mound the surface layer against the land and cause a south-easterly flow along the coast that fills the shelf from the shore outwards to a depth of 500 m deep. Shelf water temperatures at these times range from between 18°C to 14°C with seafloor temperatures warmer in winter than in summer.

6.3.2 Ambient Sound Levels

McCauley and Duncan (2001) undertook a desktop review of natural and man-made sea sound sources likely to be encountered in the Otway Basin. They concluded that natural sea sound sources are dominated by wind noise, but also include rain noise, biological noise, and the sporadic noise of earthquakes. Man-made underwater sound sources in the region comprise shipping and small vessel traffic, petroleum production and exploration drilling activities and sporadic petroleum seismic surveys.

In terms of monitoring work with the Otway and Bass Strait regions, between 2009 and 2016 the Integrated Marine Observing System (IMOS) recorded underwater sound south of Portland, Victoria (38°32.5' S, 115°0.1'E). Prominent sound sources identified in recordings include blue and fin whales at frequencies below 100 Hz, ship noise at 20 to 200 Hz, and fish at 1 to 2 kHz (Erbe et al. 2016). In the broader region, primary contributors to background sound levels were wind, rain and currents-and waves-associated sound at low frequencies under 2 kHz (Przeslawski et al. 2016), and biological sound sources including dolphin vocalisations were also recorded.

No acoustic monitoring has been undertaken within the Bass Operational Area.

Otway Gas Development Acoustic Monitoring
To gain an understanding of the existing marine acoustic environment to inform the impact assessment for the Otway Gas Development acoustic monitoring was undertaken by Woodside (2003). During April-May 2001 two underwater noise loggers were placed (5.1 km and 2.9 km south-west of an exploration petroleum drilling vessel at the Thylacine site to measure underwater noise before, during and after drilling activity. Only one of the loggers (5.9 km) was able to be recovered. A further logger was placed in the shipping lane approximately 60 km due south of Port Fairy to measure ambient noise produced by physical, man-made and biological sources between late November 2001 and early March 2002.

The following features were noted with respect to underwater noise environment at the Thylacine location:

- Thylacine site was relatively quiet with only the passage of several boats (about ten) evident.
- Horizontal banding characteristic of persistent calling by pygmy blue whales was not evident, rather these call types occurred infrequently and at low levels indicating the respective sources were at long range.
- Evidence of low-level, distant evening fish choruses only.

The following features were noted with respect to underwater noise environment at the shipping lane location:

- Regular passages of boats evident.
- Regular evening fish choruses, there were also dawn choruses and persistent low level calling by these sources over daytime.
- Blue whale calling persisted over many hours, an example is the first close passage for the season just before midday on 4 January 2002 followed by several more animals a day later.
- Evidence of calling from at least three other whale species.
- Baseline broadband underwater noise for the period was in the order of 93 to 97 dB re 1 µPa with shipping raising the averaged noise level above 105 dB re 1 µPa for 6% of the deployment time.

An acoustic monitoring program was also undertaken during exploratory drilling of the Casino-3 well. A sound logger located 28.03 km from the drill site did not detect drilling noise and recorded ambient noise that ranged between 90 and 110 dB re 1 µPa (McCauley 2004). Passive acoustic monitoring commissioned by Origin from April 2012 to January 2013, 5 km offshore from the coastline east of Warrnambool, identified that ambient underwater noise in coastal areas are generally higher than further offshore, with a mean of 110 dB re 1 µPa and maximum of 161 dB re 1 µPa (Duncan et al. 2013).

More recently, JASCO Applied Sciences (Australia), JASCO, completed a monitoring study for Beach in relation to exploration drilling activities at the Artisan-1 well with the aim of completing an acoustic characterisation of the drilling and associated vessel activity within the Otway Basin. McPherson et al. (2021) details the monitoring program and results. Four recorders were deployed in February and retrieved in early April 2021 with Stations 1 through 4 deployed at distances of 0.336, 1.13, 5.11, and 25 km from the Ocean Onyx drill rig.

The results for Station 4, the furthest from the drill rig, were a median broadband ambient noise of 104.5 dB re 1 µPa, a mean of 118.3 dB re 1 µPa, a minimum of 86.6 dB re 1 µPa, and a maximum of 153.6 dB re 1 µPa. This is a larger range than was recorded for Casino 3. The mean levels at Station 4 are 8.3 dB higher than those recorded 5 km offshore of Warrnambool, while the maximum recorded at Station 4 is lower by 7.4 dB. For Station 4 contributors to the soundscape were weather, shipping, and marine mammals. Local variations in ambient noise and received levels can depend upon water depth and the proximity to contributors. In this case, the shipping lanes and the frequency and proximity of vessel passes are strong drivers of the ambient noise at Station 4. The quieter levels reported at Thylacine in Lattice Energy (2017) are likely due to the placement of the monitoring station at a

distance from the shipping lanes, which limited their contributions to the data set and thus resulted in a lower reported range of received sound levels.

6.3.3 Water Quality

Marine water quality considers chemical, physical and biological characteristics with respect to its suitability to support marine life, or for a purpose such as swimming or fishing. Marine water quality can be measured by several factors, such as the concentration of dissolved oxygen (DO), the salinity, the amount of material suspended in the water (turbidity or total suspended solids) as well as the concentration of contaminants such as hydrocarbons and heavy metals.

The Bass Strait and Otway Basin are known for a complex, high energy wave climate and strong ocean currents (Origin 2015), and therefore water column turbidity on the Victorian coastline is subject to high natural variability. Weather conditions in the coastal environment around Port Campbell and Port Ferry are known to influence offshore hydrodynamic conditions and are a driver of sediment dynamics, impacting benthic and pelagic habitats and changing water column turbidity. Wave-driven sediment resuspension generates high turbidity levels within coastal zones, commonly exceeding 50 mg/L (Larcombe et al. 1995), but coastal communities appear generally well adapted to deal with these extrinsic stresses.

6.3.3.1 Bass

The nutrient concentrations in Central Bass Strait are low compared to that of what is seen at its extremities (Gibbs et al. 1986, Gibbs 1992). It is hypothesised that this could be due to the biological demands of the Bass Strait waters consuming much of the nutrients before moving into Central Bass Strait (Gibbs 1992). In the nearshore areas of the Planning Area, water quality may be negatively affected through the discharge of polluted waters from rivers, which drain catchments dominated by stock grazing and small coastal settlements (Parks Victoria 2006b).

6.3.3.2 Otway

The Otway Basin is characterised by high wave energy and cold temperature waters subject to upwelling events (Bonney coast upwelling) around the continental shelf margin (Origin 2015). Significant upwelling of colder, nutrient rich deep water during summer can cause sea surface temperatures to decrease by 3°C compared with offshore waters (Butler et al. 2002).

An environmental survey was undertaken from November 2019 to January 2020 for the Otway Gas Development (Ramboll 2020). Water samples were collected at two of the gas fields, Artisan and Thylacine. Sample locations are shown in Figure 6-16. The Artisan field is representative of the water quality closer to shore, while the Thylacine field is representative of water quality within the offshore areas.

In situ measurements were taken for dissolved oxygen (DO), pH and oxidation-reduction potential (ORP), and DO and pH were assessed against the default trigger values for physical and chemical stressors for south-east Australia for slightly disturbed ecosystems set out in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000). Trigger values are used to assess risk of adverse effects due to nutrients, biodegradable organic matter and pH in various ecosystem types.

DO was between the lower and upper limits of 90 and 110% saturation for marine waters in all samples. Likewise, pH was between the lower and upper limits of 8.0 and 8.4 for all samples. The range of ORP measurements indicated a well oxygenated, ecologically healthy environment.

Laboratory analyses for a suite of analytes were undertaken and compared to the ANZECC (2000) default trigger values for physical and chemical stressors for nutrient analytes and the trigger values for toxicants at alternative levels of protection for all other analytes.

The concentration of ammonia, nitrite and reactive phosphorus was at or below the level of reporting (LOR) for all samples. Only one sample contained a concentration of nitrate-nitrite, NO_3, Total kjeldahl nitrogen (TKN) and total nitrogen (TN) above the LOR, however, none of the measurements exceeded ANZECC trigger values. Concentrations of total phosphorus (TP) were recorded in all samples, but all measurements were well below ANZECC trigger values. Total suspended solids (TSS) was typically within the range expected for unmodified marine waters.

The concentrations of Cd, Cr, Co, Pb, Hg, and Ni were at or below LOR in all samples. The concentration of Cu was below, at or very close to the limit of reporting (LOR) for all samples. The concentration of Zn against ANZECC protection level (or trigger values) were below the 90% protection level but concentrations variously exceeded 95 or 99% protection levels. This result is consistent with a slightly disturbed marine system which is described in (ANZECC 2000) as an ecosystem in which biodiversity may have been affected to small degree by human activity.

Benzene, toluene, ethylbenzene and xylene (BTEX) and poly aromatic hydrocarbon (PAH) were below the detection limit in all water samples. Very low traces of total recoverable hydrocarbon (TRHs) were detected in the Thylacine_1_2 water sample but were at levels of no concern. TRHs were below detection limits in all other samples. The level of chlorophyll a in filtered samples was below the detection level.

In summary, the water quality at the Thylacine and Artisan survey areas indicated an undisturbed mid-depth environment.

It is expected that water quality within the Otway Operational and Planning Areas will be typical of the offshore marine environment of the Otway Basin, which is characterised by high water quality with low background concentrations of trace metals and organic chemicals.

6.3.4 Sediment Quality

6.3.4.1 Bass

Sediment sampling has not been undertaken within the Bass Operational Area and will be done as part planned OGV seabed survey.

Origin Energy, as the previous operator of the BassGas Development, undertook several geotechnical surveys in and around the Yolla-A platform. These surveys indicate that the seabed is flat and featureless, with surveys prior to construction indicating the seabed has very soft to soft alternating layers of silty carbonate clay and silty sands containing fragile white shell fragments (Thales Geosolutions 2001).

6.3.4.2 Otway

It is expected that sediment quality within the Otway Operational and Planning Areas will be typical of the offshore marine environment of the Otway Basin.

An environmental survey was undertaken from November 2019 to January 2020 for the Otway Gas Development (Ramboll 2020). Sediment samples were collected at two of the gas fields, Artisan and Thylacine using a Double Van Veen grab sampler (refer to Figure 6-16 for sample locations). Due to poor weather conditions sampling had to be reduced. It was decided that the Artisan field would be representative of the sediments closer to shore, while the Thylacine field which is further offshore would be representative of the Geographe field. Three replicate sediment samples were to be collected at each of the fields, however, this was not always possible because of the compacted substrate. The resulting samples included four replicate samples from Thylacine and two replicate samples from Artisan.

The sediment within all samples and, therefore at both fields, was predominantly sand with a range of 95-97% as a proportion of each sample. There was very little silt and a maximum of 4.7% for the clay fraction. There were no discernible trends based on the location of sample collection.

The ORP or oxidation reduction potential of sediments within the samples was measured and the anoxic layer with low ORP was not detected in any of the sediments analysed and the range of measurements indicated that these sediments maintain a well oxygenated, unmodified environment.

There was a notable degree of variability in the nutrient samples collected in the Thylacine field, however the small number of samples means that a trend or pattern is not discernible. Nitrate-nitrite was not detected in any samples. Total organic content and detectable nitrogen concentrations were slightly higher in the Artisan samples compared to the Thylacine samples. Generally, the concentrations of nutrients in the marine sediments were to be expected for this environment and type of sediment.

Of the inorganic compounds tested, Cd, Cu, Pb, Hg, Ni and Sn were below the limit of reporting in all sediment samples. The concentration of Cr in sediments was low, and well below the Interim Sediment Quality Guidelines low trigger value of 80 mg/kg from the recommended sediment quality guidelines set out in ANZECC (2000). The concentration of Cr was slightly higher in the samples from Artisan than those from Thylacine. Zn was detected in two of the six samples (one sample from each field) and was well below the ISQC-Low trigger value.

BTEXs, PAHs, PCBs and TRHs were either below the LOR or at levels of no concern.

In summary, sediments had a high ORP and low or undetectable levels of toxicants indicating an unmodified seabed environment. It is expected that sediment quality within the Otway Operational and Planning Areas will be typical of the offshore marine environment of the Otway Basin.

6.3.5 Air Quality

Historical air quality data for the region is available from the Environment Protection Authority (EPA) Victoria air quality monitoring stations, and Cape Grim Baseline Air Pollution Station on Tasmania's west coast.

The Victorian air quality data is collected at 15 performance monitoring stations representing predominantly urban and industrial environments in the Port Phillip and Latrobe Valley regions of Victoria. Results are assessed against the requirements of the National Environment Protection (Ambient Air Quality) Measure for the pollutants carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), sulphur dioxide (SO_2), lead (Pb), particles less than 10 micrometres in diameter (PM10) and particles less than 2.5 micrometres in diameter (PM2.5). The most recent annual air monitoring report shows Victoria's air quality in 2015 was generally good with AAQ NEPM (Ambient Air Quality National Environmental Protection Measure) goals and standards being met for carbon monoxide (CO), nitrogen dioxide (NO_2), Ozone (O_3) and sulphur dioxide (SO_2). There were some exceedances for particles.

The Geelong monitoring station is the closest to the Operational Areas; however, it is situated in an urban environment and is not representative of the clean air environment over the majority of the Planning Area. The Cape Grim Baseline Air Pollution Station data is likely a more reliable point of reference for air quality in the Operational and Planning Areas as the air sampled arrives at Cape Grim after long trajectories over the Southern Ocean and is representative of a large area unaffected by regional pollution sources (cities or industry) (CSIRO 2017). The Cape Grim station monitors greenhouse gases (GHGs), including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and synthetic GHGs such as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6).

Historical air quality data from Cape Grim show that most GHGs have shown continuous increases in concentration since the mid-to-late 1970s with carbon dioxide levels increasing by more than 15% since 1976, and concentrations of methane and nitrous oxide increasing by around 20% and 8% respectively since 1978. The increase in methane levels however has slowed recently and CFCs and halons are in decline. Increases have been attributed to anthropogenic causes, for example, fossil fuel consumption and agricultural practices (CSIRO 2017).

6.3.6 Bonney Coast Upwelling

The Bonney coast upwelling is mainly driven by the frequent south-easterly winds during the austral summer (Lewis 1981, Middleton and Bye 2007, Nieblas et al. 2009, Schahinger 1987). The frequent south-easterly winds are the result of southern migration of the subtropical ridge (Nieblas et al. 2009; Schahinger 1987). The upwelling occurs via Ekman dynamics, where the ocean surface experiences a steady wind stress which results in a net transport of water at right angles to the left of the wind direction which brings cold, nutrient rich water to the sea surface.

Huang and Wang (2019) developed an image processing technique to map upwelling areas along the south-eastern coast of Australia. This study used monthly Moderate Resolution Imaging Spectroradiometer sea surface temperature (SST) composites between July 2002 and December 2016, which were generated from daily SST images with a spatial resolution of ~1 km. As upwelling in winter is unlikely to occur images during this period were not analysed. Upwelling reaching the surface often displays a colder SST signature than the adjacent area (e.g., Dabuleviciene et al. 2018, Gill et al. 2011, Kampf et al. 2004, McClatchie et al. 2006, Oke and Griffin 2011, Oke and Middleton 2001, Roughan and Middleton 2004, Willis and Hobday 2007). This negative SST anomaly is the foundation of upwelling mapping using SST data (Huang and Wang 2019).

The spatial patterns of the mapped Bonney coast upwelling have been shown to follow a clear temporal pattern. When the upwelling season starts during late spring and early summer (November

and December), the influence of the Bonney coast upwelling was found to be often restricted to the coast. During the mid-summer and early autumn (January to March) when the upwelling is the strongest, the upwelling influence often extended to the shelf break before retreating in April (Huang and Wang 2019).

Gill et al. (2011) states that the Bonney coast upwelling generally starts in the eastern part of the Great Australian Bight and spreads eastwards to the Otway Basin. At the height of the Bonney coast upwelling during February and March, the upwelling's area of influence often exceeds 12,000 km^2, its SST anomaly often exceeds 1°C, and its chlorophyll-a concentrations are often >1.5 times of its adjacent areas (Huang and Wang 2019).

Variability

While the general characteristics of the Bonney coast upwelling are broadly understood virtually nothing is known of the longer-term variability of the phenomenon. Alongshore wind is the predominant mechanism in the upwelling, which is, therefore, directly impacted by any changes to the strength or frequency of these winds. However, not all favourable upwelling winds lead to an upwelling event. Huang and Wang (2019) state that each year for the period of 14 years (Sept 2002 to May 2016) of their study there was large variability in the distribution of the upwelling influence areas, month to month, season to season and year to year.

The El Niño – Southern Oscillation (ENSO) has been identified by some authors as a potential driver of upwelling strength along the south Australian coast. The ENSO is the dominant global mode of inter-annual climate variability, is a major contributor to Australia's climate and influences Australia's marine waters to varying degrees around the coast. The two phases of ENSO, El Niño and La Niña, produce distinct and different changes to the climate.

Middleton et al. (2007) examined meteorological and oceanographic data and output from a global ocean model. The authors concluded that El Niño events lead to enhanced upwelling along Australia's southern shelves. However, it has been found that relationships between ENSO events and upwelling and production indices off southern Australia are weak due to the high interannual and inter-seasonal variability in these indices.

Huang and Wang (2019) results indicate that the ENSO events are likely to have a low-to-moderate impact on the upwelling intensity although the El Nino events tend to strengthen upwelling intensity along the south-east coast of Australia with La Nina events tending to weaken upwelling intensity. Previous studies (Middleton and Bye, 2007; Middleton et al. 2007) indicated that the El Nino events would raise the thermocline (along the Australian margin) which effectively forms a colder and nutrient-rich pool at shallower depths. This is likely to enhance upwelling intensity, with higher SST and chlorophyll-a anomalies and a larger area of influence.

Ecological importance

The primary ecological importance of the Bonney coast upwelling is as a feeding area for the blue whale (*Balaenoptera musculus*). The upwelled nutrient-rich re-heated Antarctic intermediate water promotes blooms of coastal krill, *Nyctiphanes australis*, which in turn attracts blue whales to the region to feed.

The Bonney coast upwelling is one of only two identified seasonal feeding areas for blue whales in Australian coastal waters and is one of 12 known blue whale feeding aggregation areas globally. Sightings of the sei whale in the upwelling indicate this is potentially an important feeding ground for

the species (Gill et al. 2015). There have also been sightings of the fin whale, which indicate this could potentially be an important feeding ground (Morrice et al. 2004)

The high productivity of the Bonney coast upwelling also leads to other attributes such as algal diversity and its productivity as a fishery. This productivity is also capitalised on by other higher predator species such as little penguins and fur-seals feeding on baitfish. Robinson et al. (2008) postulated that upwelling waters may bring fish prey of Australian fur-seals to surface waters, which are then flushed into Bass Strait within foraging range of seals.

Linkages between climate, upwelling strength and blue whale abundance
The complex interaction between climatic conditions, upwelling strength and seasonal blue whale distribution and abundance within the Bonney coast upwelling is currently poorly understood other than at a general level. Factors to be resolved to enable a more detailed understanding include observations that not all strong upwelling-favourable winds necessarily lead to strong upwelling events (Griffin et al. 1997) and that increased upwelling does not necessarily equate to increased productivity as conditions may be less optimal for plankton growth. Huang and Wang (2019) found a generally weak and unclear correlation between chlorophyll-a and SST. This weak correlation may be due to chlorophyll-a concentrations (a remote measure of plankton population) are also influenced by other complex oceanographic and biological mechanisms such as grazing, seasonality and transportation.

Further an increase in plankton biomass does not necessarily coincide with the presence of the blue whales. Review of pygmy blue whale aerial observation data from Gill et al. (2011) from the 2001-02 to 2006-07 seasons, and additional surveys in the Otway Basin commissioned by Origin during February 2011 and November-December 2012 did not find a significant positive correlation between El Niño conditions and pygmy blue whale abundance. Such a positive correlation could be expected if El Niño conditions caused stronger upwelling, stronger upwelling led to increased planktonic productivity and blue whales were more likely to be present when productivity is higher.

Two of the six seasons subject to aerial surveys in the eastern section of the Otway Basin (Gill et al. 2011) were determined by the Bureau of Meteorology to demonstrate weak to moderate El Nino conditions. The remainder of the years were assessed to be neutral. The two El Nino seasons (2002-03 and 2006-07) corresponded with the lowest observation frequencies (sightings/1,000 km) for pygmy blue whales of all the yearly surveys.

Aerial surveys commissioned by Origin undertaken during February 2011 and November-December 2012 were undertaken during La Nina events classified by the Bureau of Meteorology as very strong and strong respectively. Although observation frequencies are not available, the absolute numbers of pygmy blue whales observed was substantially higher than during the 2001-01 to 2006-07 surveys. Also, of note is that pygmy blue whales observed during February 2011 were congregated along the seaward edge of a plume of terrestrial runoff, potentially suggesting use of this plume as a feeding resource, which has no relationship to upwelling.

As such, the interactions between climate and ecology for this upwelling system are complex and no definitive linkages between climatic events, upwelling strength and blue whale abundance have yet been described. Given this, development of management strategies for petroleum activities in the area using prevailing climatic conditions as a predictor of seasonal blue whale abundance is not currently feasible.

Operational Setting

Mapping of the Bonney coast upwelling frequency by Huang and Wang (2019) identified that the occurrence of an upwelling event between 2002 and 2016 (measured by remote sensing of a combination of SST anomaly and chlorophyll-a) within the Operational Areas was unlikely with an upwelling frequency for this area of <10% (Figure 6-14). The closest areas of increased frequency of upwelling events to the Operational Areas (10-30% occasional/semi-seasonal) were small, isolated areas situated in coastal areas (Figure 6-14) >13 km from the Otway Operational Area. Areas of further increased frequencies of Bonney coast upwellings (30-50% seasonal) were found to the west >200 km of the Otway Operational Area.

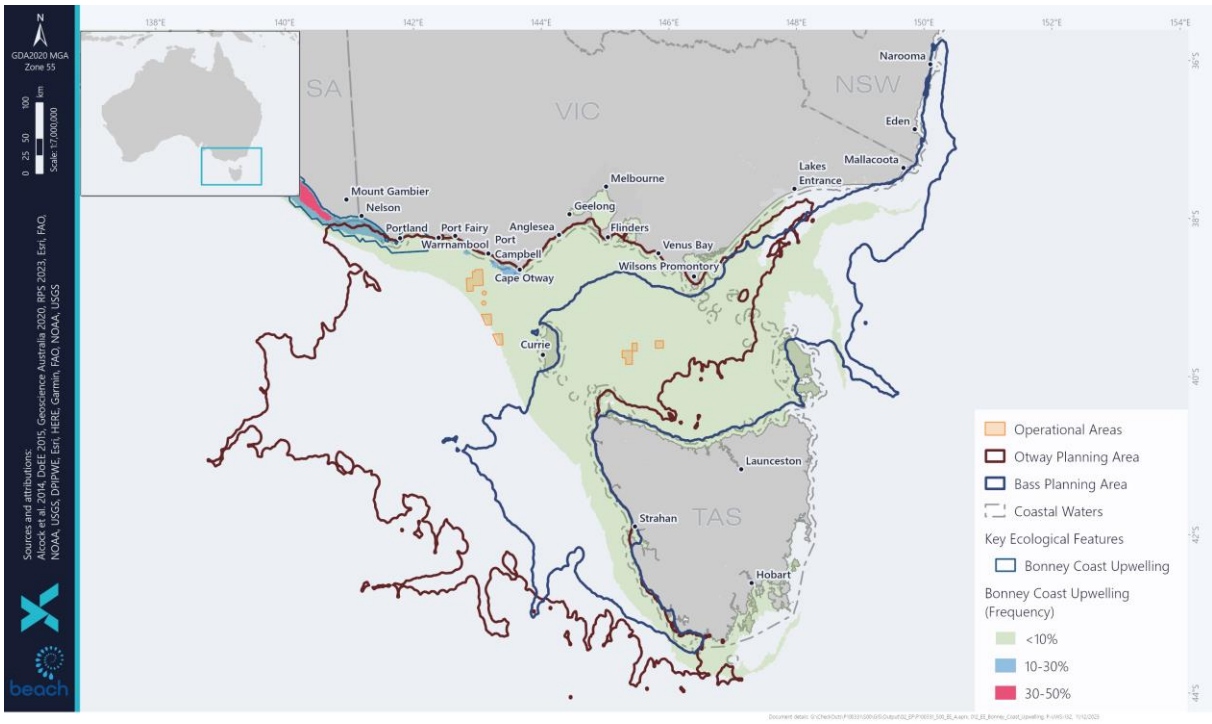


Figure 6-14: Bonney Coast Upwelling Frequency within the Operational and Planning Areas (*Source: Huang and Wang 2019; Geoscience Australia 2020*).

6.4 Ecological Environment

To characterise the ecological environment, a literature search and online resources and databases were reviewed to identify and assess flora and fauna species known to be present or potentially present in the Operational and Planning Areas. The following information sources were reviewed to assure consistency with previous assessments and to develop an up-to-date overview of the existing environment.

- Online government databases, publications, and interactive mapping tools, such as the Species Profile and Threats (SPRAT) database.
- Protected Matters Search Tool (PMST) for Matters of National Environmental Significance (MNES) protected under the EPBC Act.
- Published observations, data, and statistics on marine mammals.
- Reports from scientific experts and institutions, marine biologist and experts in blue whale and southern right whale populations in the Otway area.
- Woodside's Otway Gas Project Environmental Effects Statement/Environmental Impact Assessment (EES/EIS) (2003) (Woodside 2003).
- Santos Casino Gas Field Development Environmental Report (2004) (Santos 2004).
- BHP Billiton's Minerva Environmental Impact Statement and Environmental Effects Statement and Associated Supplemental Environmental Monitoring published research papers (BHP Billiton 1999).
- Beach Energy's Environment Plans for previous activities in the region.
- National Conservation Values Atlas (NCVA).
- Relevant listings under the Victorian FFG Act 1988 (DEECA 2023)
- Relevant listings under the Tasmanian Threatened Species Conservation Act (1995) (TSC Act)
- Relevant environmental guidelines and publicly available scientific literature on individual species.

6.4.1 Benthic Habitats and Species Assemblages

Benthic communities are biological communities that live in or on the seabed. These communities typically contain light-dependent taxa such as algae, seagrass and corals, which obtain energy primarily from photosynthesis, and/or animals such as molluscs, sponges and worms. Benthic habitats are the seabed substrates that benthic communities grow on or in; these can range from unconsolidated sand to hard substrates (e.g. limestone) and occur either singly or in combination.

6.4.1.1 Bass

Surveys undertaken within the Bass Operational Area recorded a flat and featureless seabed with soft to soft alternating layers of silty carbonate clay and silty sands containing fragile white shell fragments (Thales Geosolutions 2001).

Marine invertebrate diversity in South Australian waters is considered to be high with the Bass Strait containing porifera, cnidarians, bryozoans, arthropods, crustaceans, molluscs, echinoderms, and annelids. Distribution of these species is understood to be irregular with little evidence of distinct biogeographic regions (Poore et al. 1985, Wilson and Poore 1987).

One of the objectives of this seabed survey is to obtain further information on the benthic habitat and species in the Bass Operational Area.

6.4.1.2 Otway

The Otway continental margin is a swell-dominated, open, cool-water carbonate platform which can be divided into depth-related zones (Boreen et al. 1993):

1. Shallow shelf: consisting of exhumed limestone substrates that host encrusting mollusc, sponge, bryozoan, and red algae assemblages.
2. Middle shelf: a zone of swell wave shoaling and production of mega-rippled bryozoan sands.
3. Deep shelf: accumulations of intensely bioturbated, fine bioclastic sands.
4. Shelf edge/top of Slope: nutrient-rich upwelling currents support extensive, aphotic bryozoan/sponge/coral communities.

The dominant benthic habitat throughout the shelf area, as indicated by the seabed and benthic habitat studies, is medium to coarse carbonate sands with areas of low relief exposed limestone (Boreen et al. 1993, BBG 2003, Ramboll 2020). The benthic species assemblages known or likely to be associated with these habitats are described in the following sections.

A video survey of the seabed at selected sites along proposed offshore pipeline routes for the Otway Gas Development (BBG 2003) found that the substrate in water depths between 82 and 66 m were predominantly low profile limestone with an incomplete sand veneer that supported a low to medium density, sponge dominated filter feeding community. Fish and other motile organisms were uncommon. In shallower depths of between 63 and 30 m, the video surveys showed a rippled, sand or sand/pebble substrate with minor sponge dominated benthic communities. The epibenthic organisms were generally attached to outcropping or sub-outcropping limestone pavements. Only in waters shallower than approximately 20 m, was an area of significant, high profile reef and associated high density macroalgae dominated epibenthos encountered.

Beach commissioned a seabed site assessment for the Otway Gas Development in 2019 (Ramboll 2020). The seabed site assessment was undertaken from November 2019 to January 2020 and ranged in water depths from 70 to 104 m. The survey extent included the potential subsea development areas and associated flowline / control umbilical routes, and is shown in Figure 6-15. The information from these surveys are relevant for the Otway Operational Areas with the exemption of the T/30P Operational Areas. The T/30P areas are part of a future seabed survey to obtain further information on the benthic habitat and species on the shelf edge and slope.

The Otway survey comprised of multibeam bathymetry, side scan sonar, magnetometer, and sub-bottom profiling, cone penetration tests and seabed samples. In addition, sediment samples for infauna were collected and the composition and percent coverage of epifauna was assessed from photographs of the seafloor taken with a drop camera. The drop camera locations within the Otway

Operational Area are shown in Figure 6-16. Drop camera images are shown in Figure 6-17 to Figure 6-24 and a summary is provided in Table 6-14.

The composition and percent coverage of epifauna was assessed from photographs of the seafloor. Percentage cover was typically no more than 37%. The seabed at Hot Tap X had the greatest average coverage of epibiota whilst the lowest coverage was recorded along the route between Artisan and Hot Tap Y. Of the gas field sites, Artisan and Hercules had a slightly greater coverage of epifauna. Of the individual epibenthic organisms, Gastropoda sp. 2 (a cone shell) and crionids (featherstars) were the most abundant.

No benthic species or ecological communities listed as threatened under the Environmental Protection and Biodiversity Conservation Act 1999 (the EPBC Act) were identified.

In summary, the seabed is similar across the Otway Operational Area, consisting of carbonate rich coarse to medium sands with areas of exposed limestone substrate (Ramboll 2020, CEE Consultants Pty Ltd 2003, BBG 2003 and Boreen et al. 1993). This type of seabed is highly mobile making it difficult for filter feeders and soft body invertebrates to survive and establish in significant populations. Epifauna is dominated by low density, patchy assemblages of branching bryozoans, gorgonian cnidarians, and sponges.

Table 6-14: Summary of the Seabed Survey Benthic Habitats

Survey Location	Summary
Artisan (Figure 6-17)	Very little bathymetric variation across the survey area with water depths ranging from 68 to 74 m. Seabed topography dominated by exposed rock on the seabed. Small patches of very thin transgressive coarse sand are present across the survey area. Megaripples were seen in some areas, with a wavelength of 1.5 to 2 m and a height of 0.3 to 0.5 m. Survey area characterised by low to moderate reflectivity characteristic of rock outcrop. A series of elevated mounds were noted in the north-west of the Artisan survey area 0.5 -1.0 m above ambient seabed. Seabed showed a scattered sessile biota on a sandy seafloor.
Geographe (Figure 6-18)	Very little bathymetric variation across the survey area with water depths ranging from 80 to 91 m. Rocky outcrops of the Port Campbell Limestone show some variable relief up to 2 m. Sand is clean washed and well sorted and comprising predominantly of angular broken shells and bryozoans. Percentage cover from the four drop camera sites ranged from zero to 55% with an average percentage cover of 13%. Predominantly hard seabed with coarse sand substrates that supports a patchy complex of branching epibiota (i.e., bryozoans, gorgonian cnidarians, and sponges).
Thylacine (Figure 6-19)	Seabed depths vary ranging from 92 to 115 m, with an overall southwestern slope. Seabed topography compromises of rocky outcrops of the regionally dipping Port Campbell limestones. Sands are coarse (siliceous) calcareous medium sand. A local relief of up to 3 m is identified on the rocky scarp surfaces, which are separated by shallow depressions often with a transgressive sandy infill.

Survey Location	Summary
	Percentage epifauna cover from the eight drop camera sites ranged from zero to 65% with an average percentage cover of 14%. Predominantly hard seabed with coarse sand substrates that supports a patchy complex of branching epibiota (i.e., bryozoans, gorgonian cnidarians and sponges). Epibiota on the seabed in the vicinity of the Thylacine gas fields is representative of what is expected at depths around 70 – 100 m. Infauna was of relatively low abundance and diversity as expected for coarse sand substrates.
La Bella (Figure 6-20)	Water depth varies from 89 to 104 m, with an overall southwestern slope. Seabed characterised by rocky outcrops interspersed with low-lying areas of shallow uncemented sediment. Seabed topography is typical of an eroded platform, with inferred calcarenite lithology. Side scan sonar results also provide flat seabed and megarippled sands and rock outcrop features. At rock exposures, seabed photographs appear to show biogenic growth.
Hercules (Figure 6-21)	Very little bathymetric variation across the survey area with water depths ranging from 71 to 77 m. Seabed characterised by rocky outcrops interspersed with low-lying areas of shallow uncemented sediment. Port Campbell limestone cap rock is covered in places by mobile sediments of 1 m thickness. Hercules site is a southern extension of the Artisan site, and therefore the seabed features bear strong similarities to those seen at Artisan site. Seabed features are typical of an eroded platform, including parallel asymmetric ridges with intermittent depressions.
Proposed Pipeline and Umbilical Routes (Figure 6-22 Figure 6-23 Figure 6-24)	Seabed terrain is largely comprised of outcropping calcarenites, incised with erosional features and interspersed with (relatively) low-lying areas where shallow uncemented sands occur. Sands are generally less than 1 m thick. Side scan sonar results also provide flat seabed and megarippled sands and rock outcrop features. At rock exposures, seabed photographs appear to show biogenic growth.

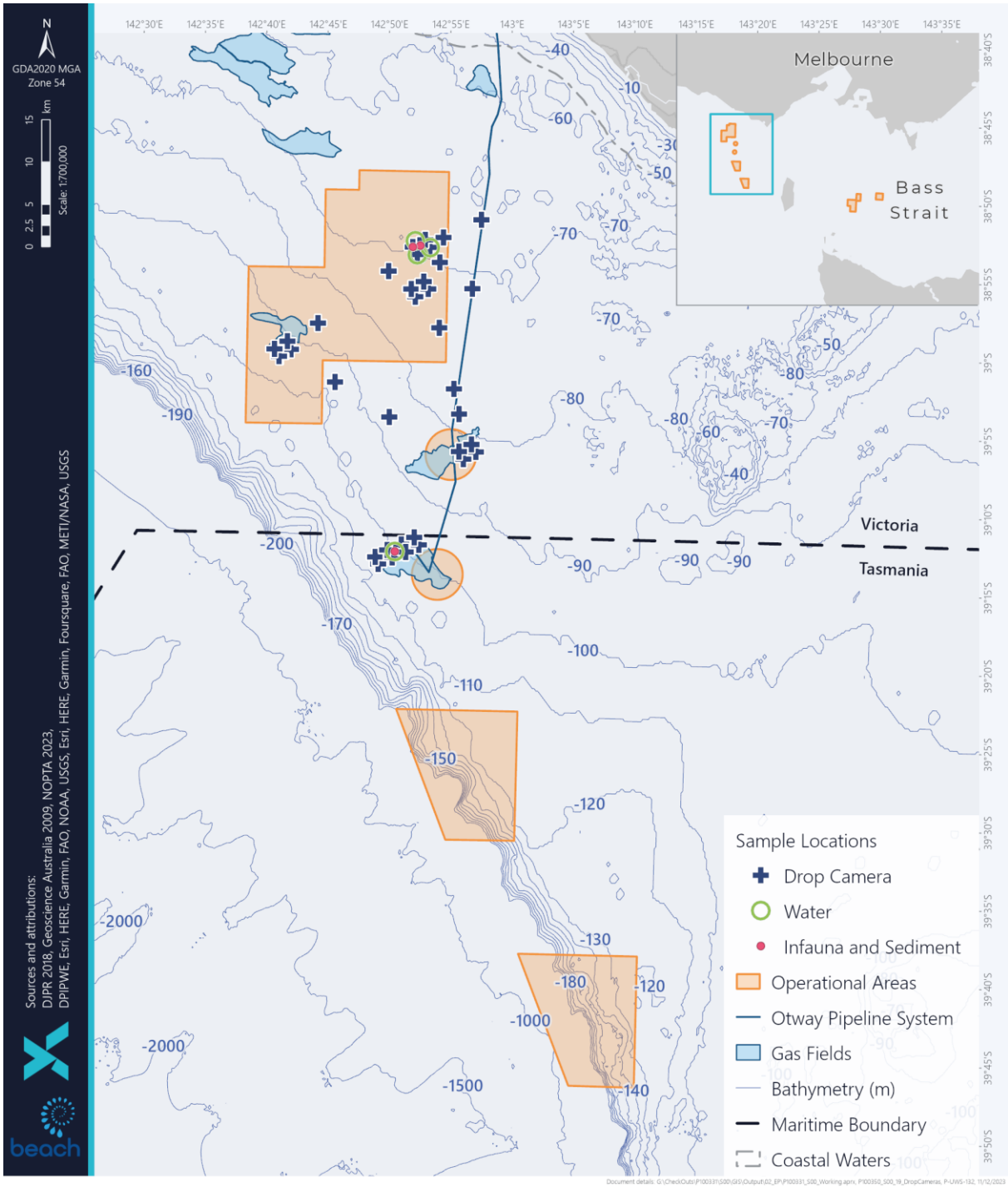


Figure 6-15: Location of the Otway Gas Development Seabed Site Assessment and the Operational Areas

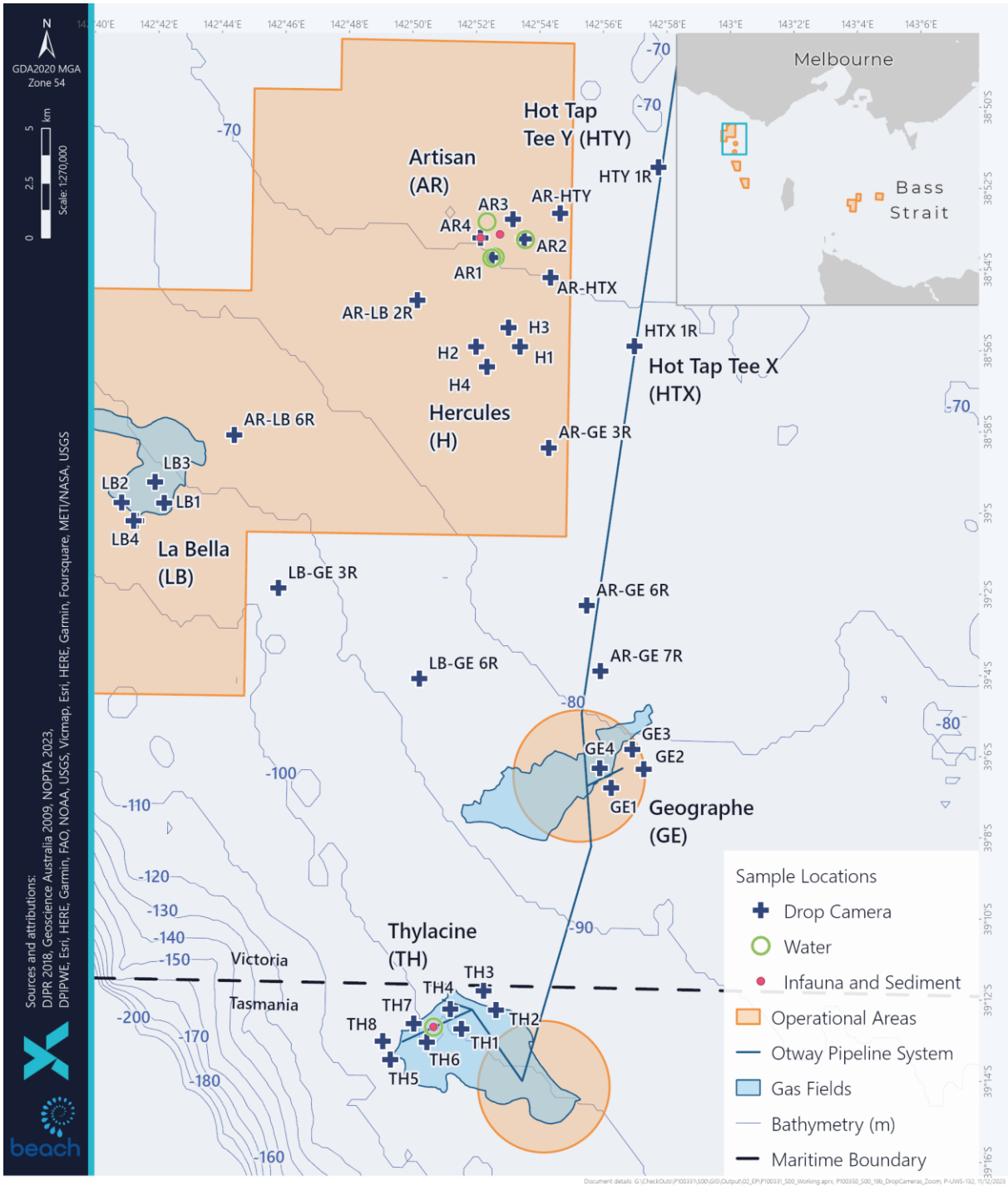


Figure 6-16: Drop Camera and Sample Locations for the Otway Gas Development Seabed Site Assessment with the Operational Areas

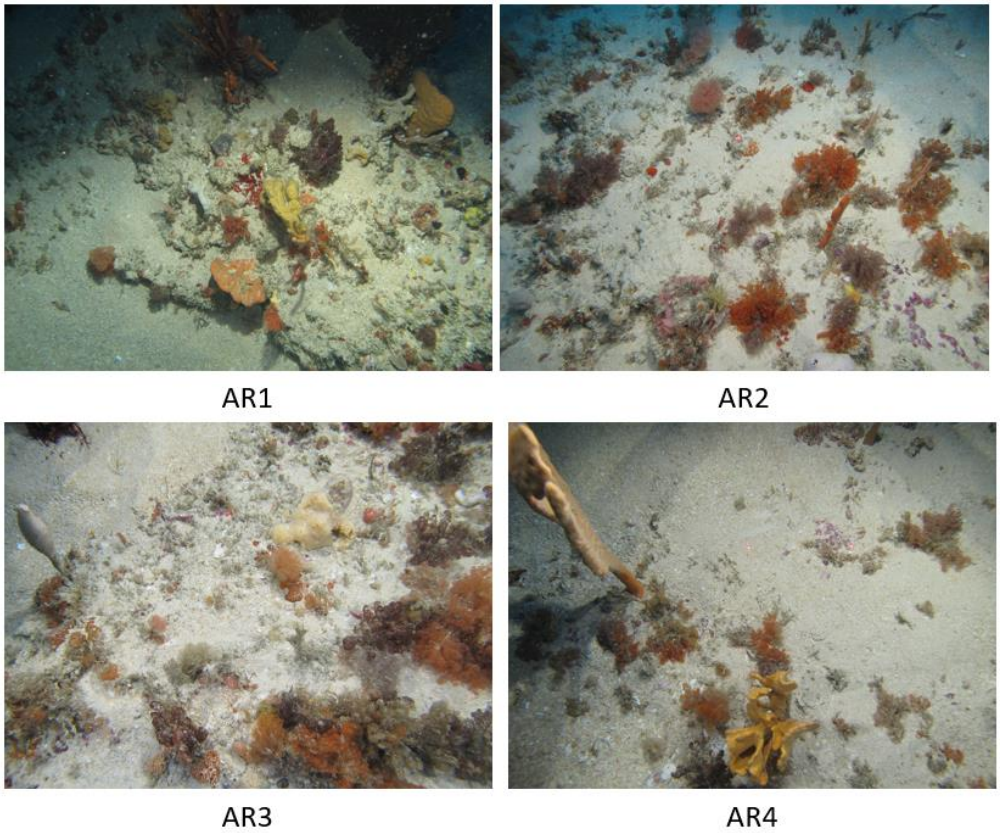


Figure 6-17: Drop Camera Images at Artisan

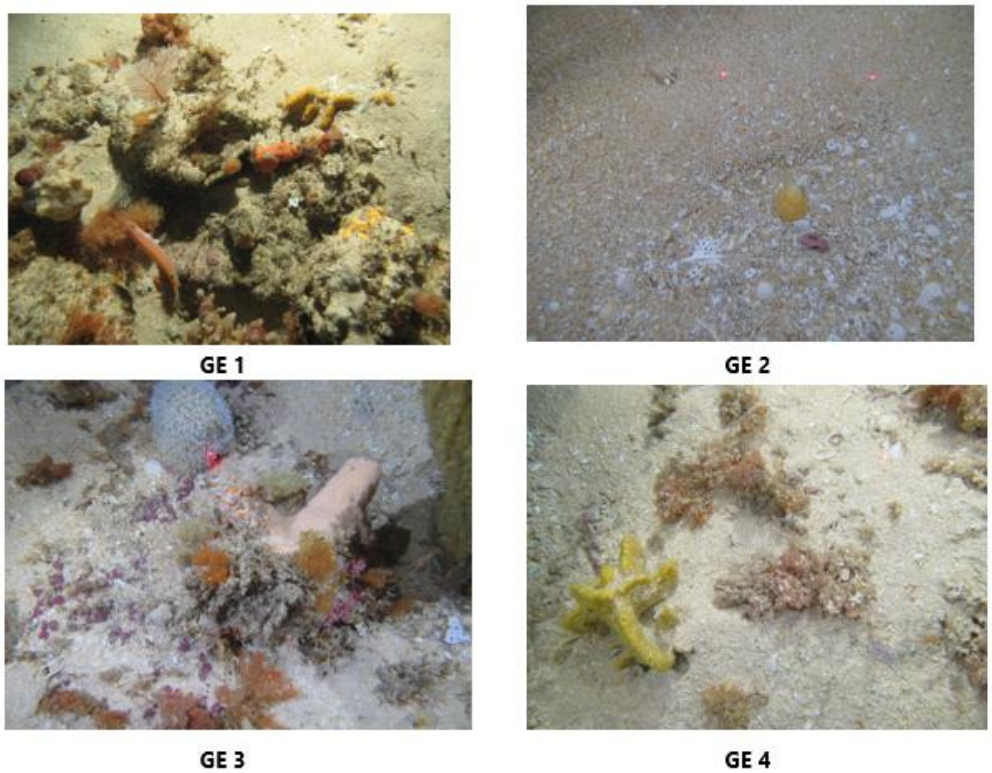


Figure 6-18: Drop Camera Images at Geographe

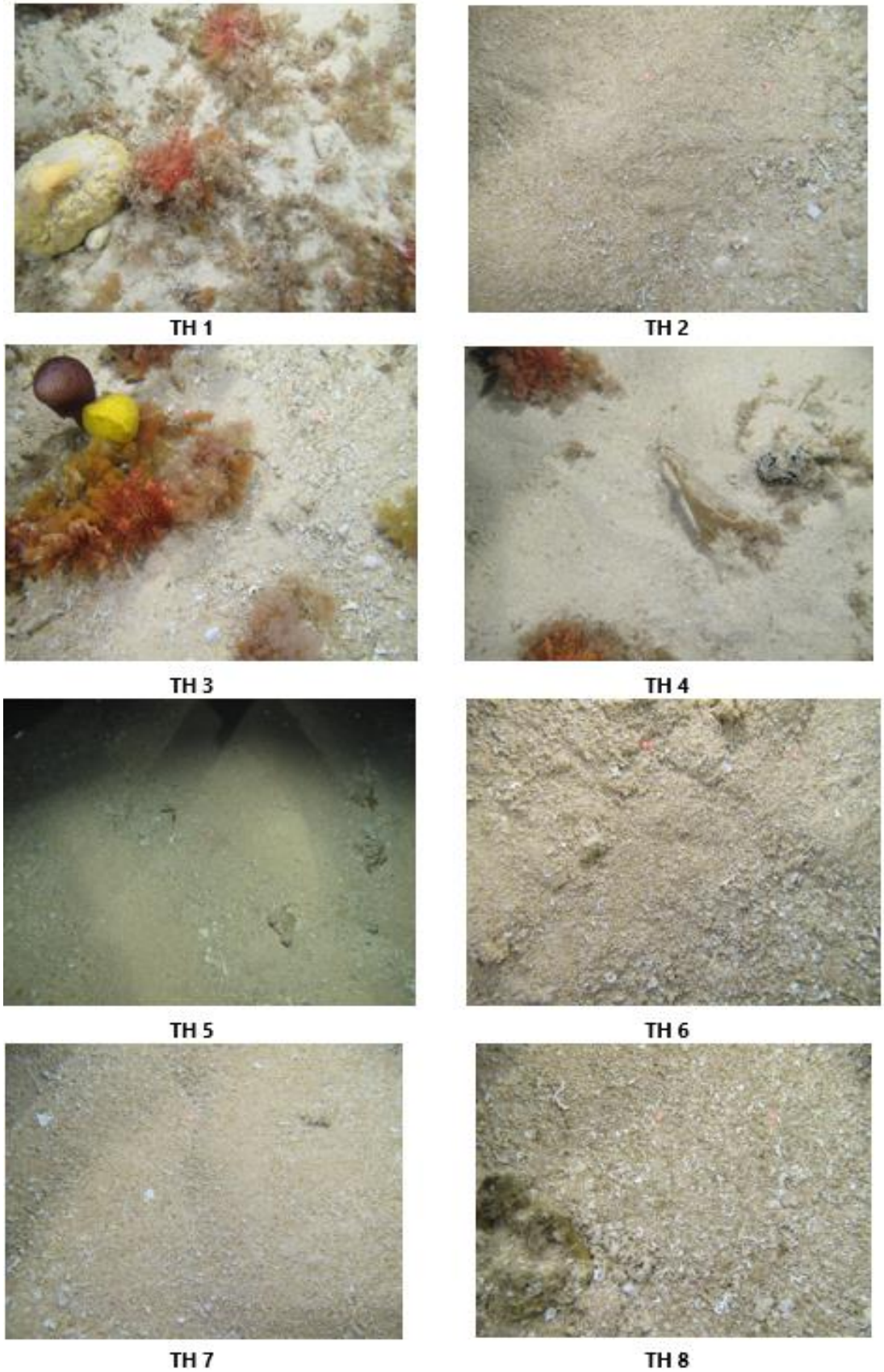


Figure 6-19: Drop Camera Images at Thylacine

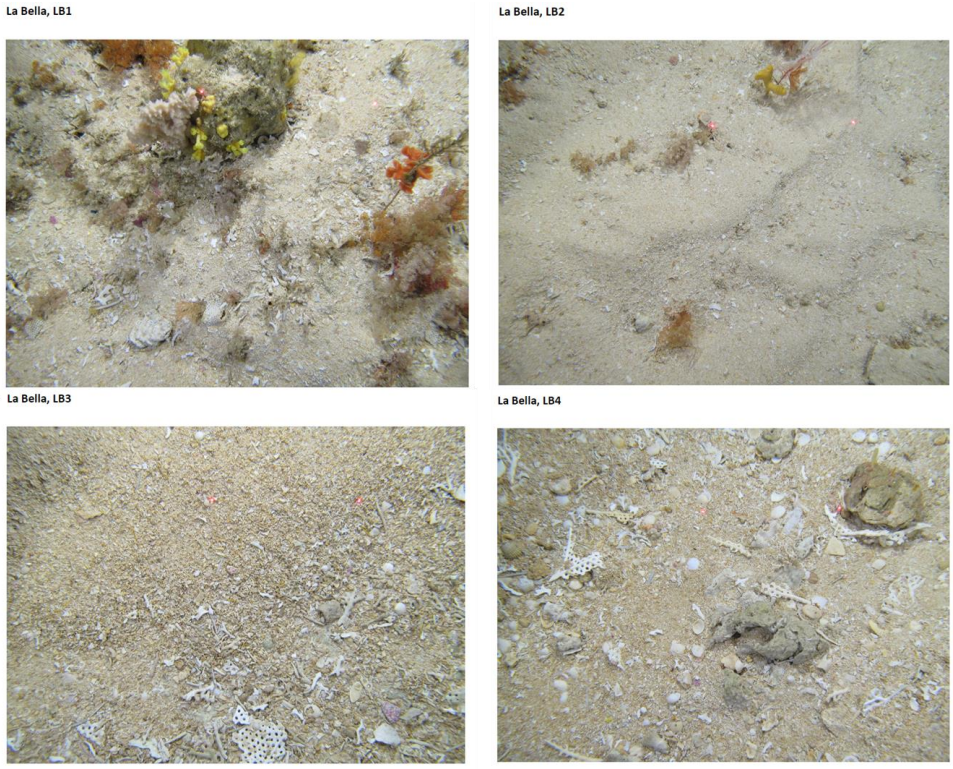


Figure 6-20: Drop Camera Images at LaBella

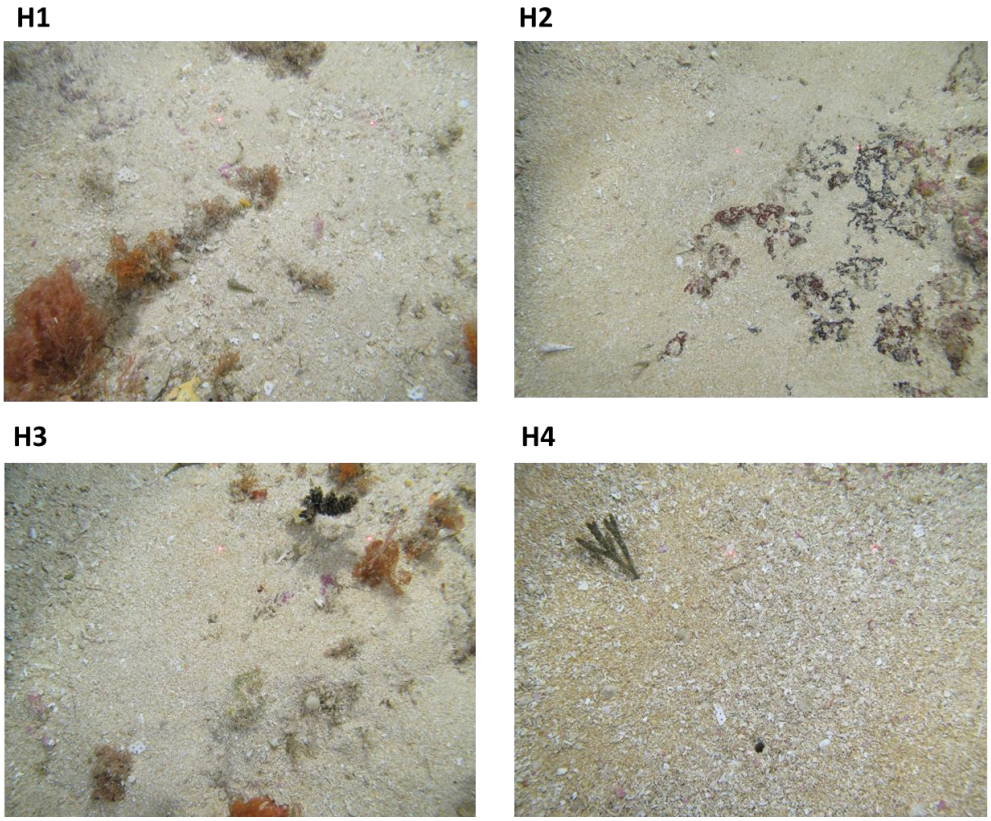
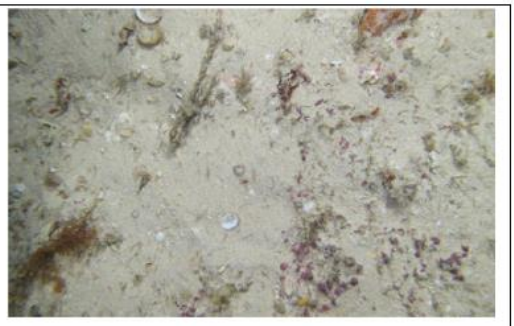


Figure 6-21: Drop Camera Images at Hercules

Hot Tap Tee X



Hot Tap Tee X

Hot Tap Tee Y

Hot Tap Tee Y

Figure 6-22: Drop Camera Images at Hot Taps

Artisan to Hot Tap Tee Y Route

Artisan to Hot Tap Tee Y Route

Artisan to Hot Tap Tee X Route

Artisan to Hot Tap Tee X Route

Figure 6-23: Drop Camera Images at Proposed Flowline Routes

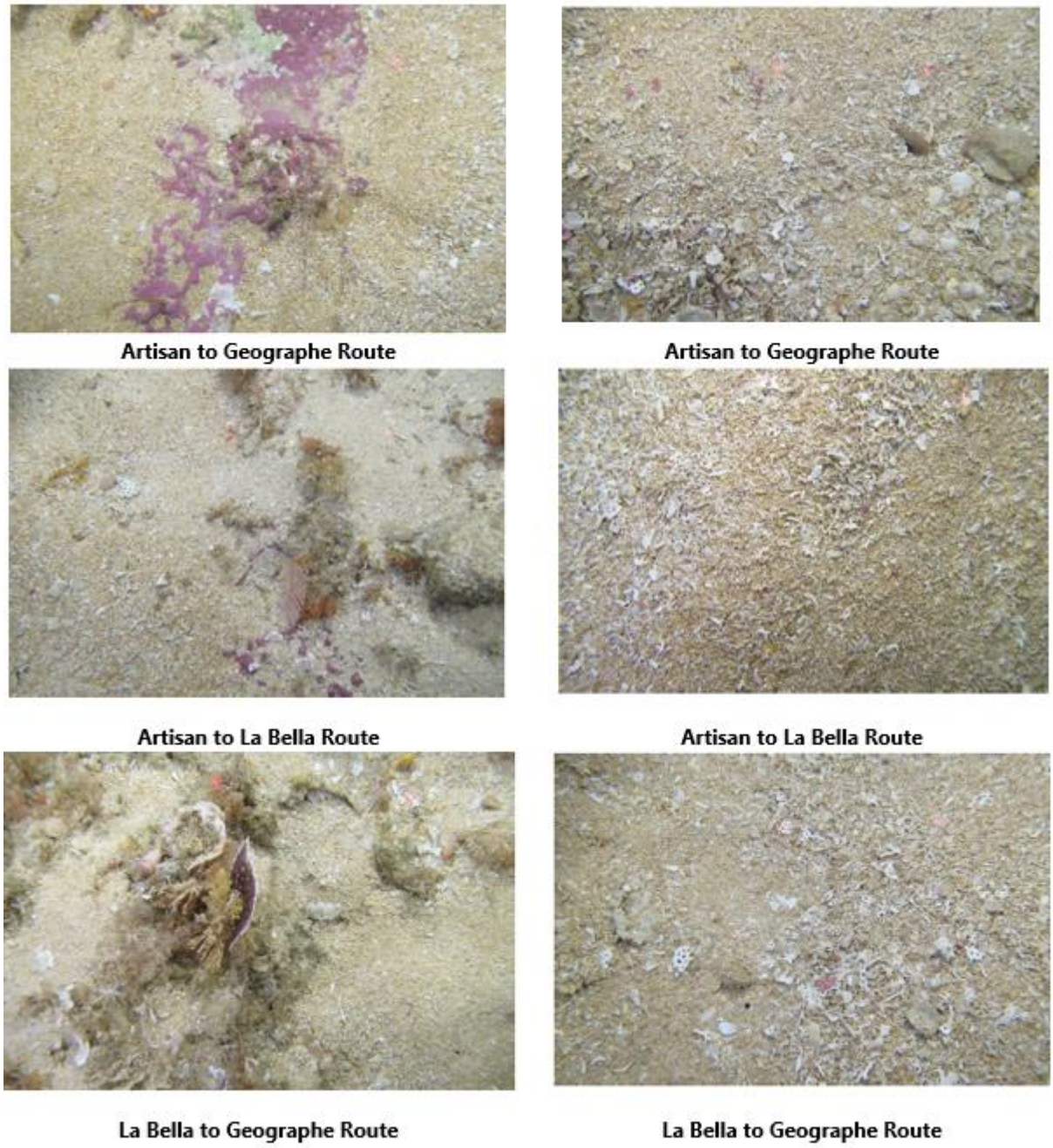


Figure 6-24: Drop Camera Images at Proposed Flowline Route and Umbilical Routes

6.4.1.3 Soft Sediment

Unvegetated soft sediments are a widespread habitat in both intertidal and subtidal areas, particularly in areas beyond the photic zone. Factors such as depth, light, temperature, and the type of sediment present can vary the biodiversity and productivity of soft sediment habitat.

The Middle Otway Shelf (70-130 m depth) is a zone of large tracts of open sand with little or no epifauna to characterise the area: infaunal communities and bivalves, polychaetes and crustaceans dominate in the open sand habitat. The Deep Otway Shelf (130-180 m) sediments consist of accumulations of intensely bioturbated, fine, bio clastic sands. The Upper Slope of Otway Shelf (>180 m) incorporates the edge/ top of the shelf which displays nutrient-rich upwelling currents support extensive, aphotic bryozoan/sponge/coral communities. The upper slope is dominated by bioturbated mixture of periplatform bioclastic debris and pelleted foraminiferal/nannofossil mud. Turbidites and resedimentation features are common. Bioturbation and shelf-derived skeletal content decrease progressively downslope and pelagic muds dominate below 500 m.

Scientific surveys have shown that some shallow Victorian sandy environments have the highest levels of animal diversity in the sea ever recorded (Parks Victoria 2016a). Some of the larger animals found in these soft sediment environments in Victoria include smooth stingray (*Dasyatis brevicaudata*), pipi (*Plebidonax deltoids*), dumpling squid (*Euprymna tasmanica*), common stargazer (*Kathetostoma leave*) and heart urchin (*Echinocardium cordatum*) (Parks Victoria 2016a).

6.4.1.4 Seagrass

Seagrasses are marine flowering plants, with around 30 species found in Australian waters (Huisman 2000). While seagrass meadows are present throughout southern and eastern Australia, the proportion of seagrass habitat within the south-eastern sector is not high compared to the rest of Australia (primarily parts of South Australia and Western Australia) (Kirkham 1997).

Seagrass generally grows in soft sediments within intertidal and shallow subtidal waters where there is sufficient light and are common in sheltered coastal areas such as bays, lees of islands and fringing coastal reefs (McClatchie et al. 2006, McLeay et al. 2003). Within the Planning Areas, seagrass meadows have been primarily recorded along the Victorian and New South Wales coastline, as well as a small overlapping meadow on the northern coast of Tasmania (Figure 6-25). Seagrass meadows are important in stabilising seabed sediments, and providing nursery grounds for fish and crustaceans, and a protective habitat for the juvenile fish and invertebrates species (Huisman 2000, Kirkham 1997).

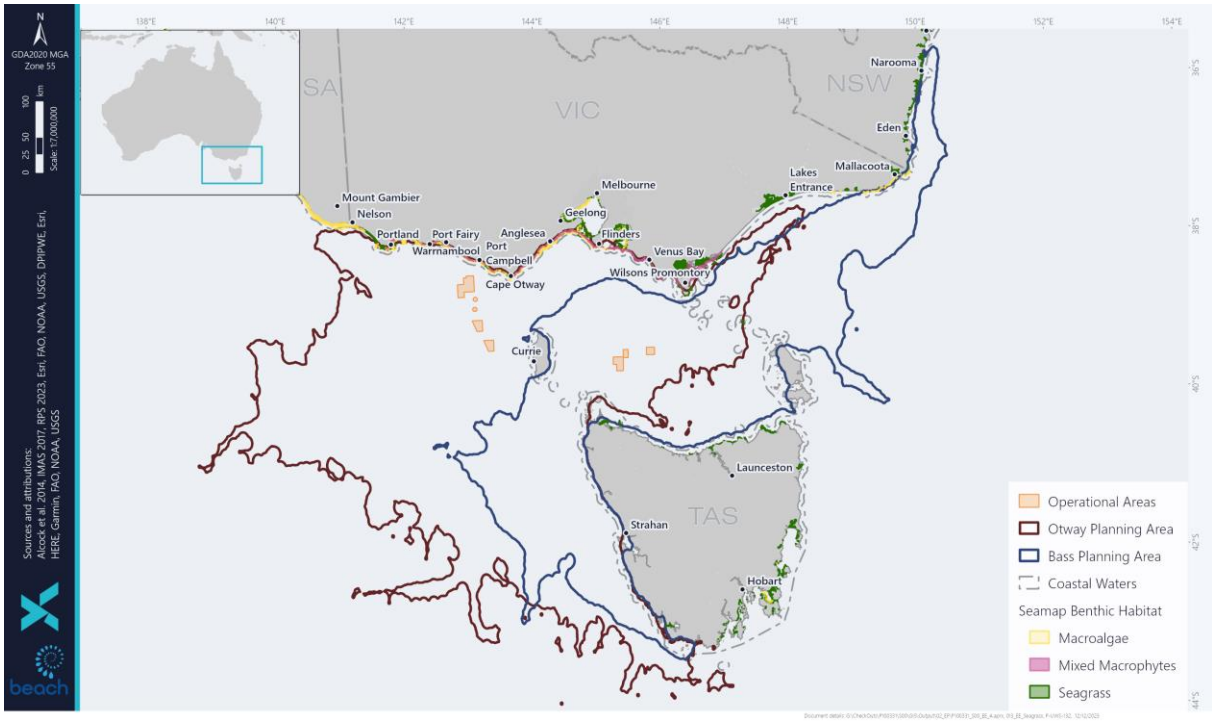


Figure 6-25: Presence of Benthic Habitat (Seagrass, Macroalgae and Mixed Macrophytes) within the Planning Areas

6.4.1.5 Algae

Benthic microalgae are present in areas where sunlight reaches the sediment surface. Benthic microalgae are important in assisting with the exchange of nutrients across the sediment-water interface; and in sediment stabilisation due to the secretion of extracellular polymetric substances (Ansell et al. 1999). Benthic microalgae can also provide a food source to grazers such as gastropods and amphipods (Ansell et al. 1999).

Macroalgae communities occur throughout the Australian coast and are generally found on intertidal and shallow subtidal rocky substrates. Macroalgal systems are an important source of food and shelter for many ocean species; including in their unattached drift or wrack forms (McClatchie et al. 2006). Macroalgae are divided into three groups: Phaeophyceae (brown algae), Rhodophyta (red algae), and Chlorophyta (green algae). Brown algae are typically the most visually dominant and form canopy layers (McClatchie et al. 2006). The presence and growth of macroalgae are affected by the principal physical factors of temperature, nutrients, water motion, light, salinity, substratum, sedimentation and pollution (Sanderson 1997). Macroalgae assemblages vary, but *Ecklonia radiata* and *Sargassum* sp. are typically common in deeper areas.

Within the Planning Areas, macroalgae have primarily been recorded along the Victorian coastline (Figure 6-25).

Kelp are a special group of large brown algae that attach themselves to solid structures to form forests. They extend their leaf-like fronds into the waters above them reaching towards the sunlight. These larger algae in turn create a habitat for smaller algae, invertebrates, and fish (VFA 2023). On Victoria's coast kelp forests grow on most rocky reefs in waters to a depth of around 30 m, although most are found in shallower waters (VFA 2023).

Bull kelp or southern bull kelp (*Durvillaea potatorum*) is a fast-growing brown macroalgae (seaweed) with large dark brown and leathery strap-like blades. It consists of a body, called the thallus, with a stipe connecting the blades to the holdfast (a structure adhering the bull kelp to the seafloor.

Offshore Victoria and Tasmania there are two main species of *Durvillaea*, these are *D. potatorum* and *D. amatheiae*. The approximate distribution of the species is shown in Figure 6-26.

Durvillaea spp. are a significant habitat. The holdfast can be inhabited by a diverse array of epifauna and infauna invertebrates. These burrow into the holdfast creating holes that can be used by a wide variety of animals. In addition, *Durvillaea* spp. grow in large groups or forests that can become important nursery areas and sanctuary areas for fish, crustaceans, and other fauna.

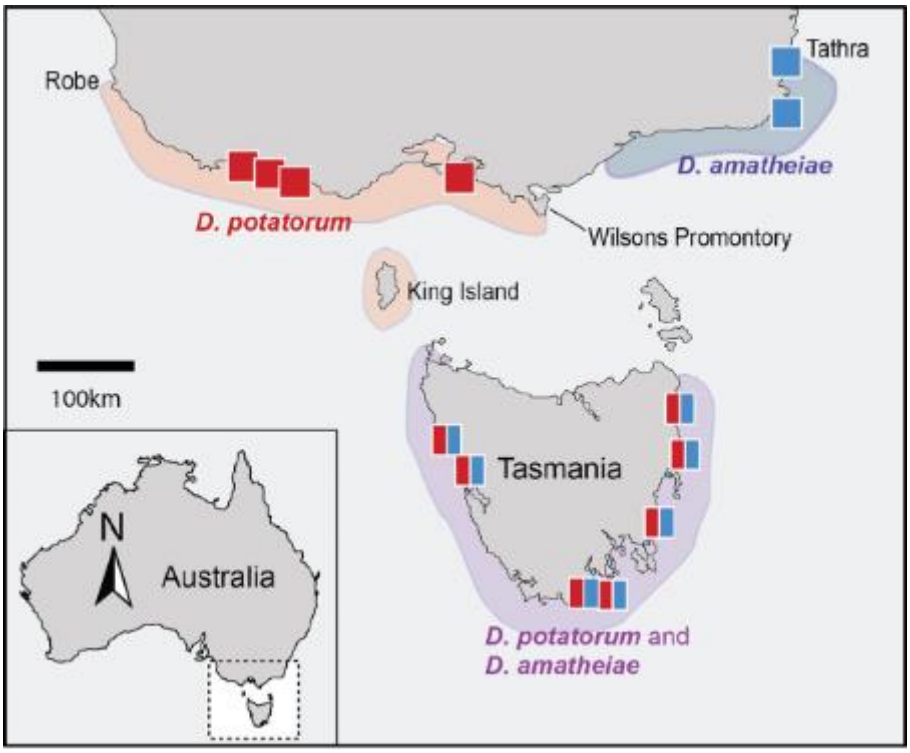


Figure 6-26: Distribution of Bull Kelp off Victoria and Tasmania (Velasquez et al. 2020)

Thurstan et al. (2017) gathered historical data on the use of bull kelp by First Nations. Bull kelp has a long history of use by First Nations in Australia, New Zealand, and Chile. In Australia this reportedly dates back 65,000 years (Thurstan et al. 2017). First Nation people in Tasmania used dried bull kelp to transport water and food. The species name came from this use: *potatorum* means 'to drink' in Latin (Government of SA 2023).

Thurstan et al. (2017) details a number of First Nations historical references for bull kelp including:

- Cultural activities and cultural history –mythology and sacred songs.
- Ceremonial activities –being burned or being used during smoking ceremonies.
- Medicinal use –bandages and medicinal poultice.
- Clothing – cloaks and shoes.

- Diet – raw, jelly, dried and roasted (preserving for several months).
- Fishing – ropes and fishing nets / traps, traps for shortfinned eels, also used to assist during diving for crayfish.
- Shelter – waterproofing, wind proofing and carpeting.

Bull kelp is also collected by the seaweed industry as described in Section 6.5.14.

6.4.1.6 Coral

Corals are generally divided into two broad groups: the zooxanthellate ('reef-building', 'hermatypic' or 'hard') corals, which contain symbiotic microalgae (zooxanthellae) that enhance growth and allow the coral to secrete large amounts of calcium carbonate; and the azooxanthellate ('ahermatypic' or 'soft') corals, which are generally smaller and often solitary (Tzioumis and Keable 2007). Hard corals are generally found in shallower (<50 m) waters while the soft corals are found at most depths, particularly those below 50 m (Tzioumis and Keable 2007).

Corals do not occur as a dominant habitat type within the Operational Areas and Planning Areas, however, their presence has been recorded around areas such as Wilsons Promontory National Park and Cape Otway. Reef development by hard corals does not occur further south than Queensland (Tzioumis and Keable 2007). Soft corals are typically present in deeper waters throughout the continental shelf, slope and off-slope regions, to well below the limit of light penetration.

Reproduction methods for cold water corals are not as well understood as warm water corals such as those of the Great Barrier Reef, but it is likely that some are still broadcast spawners (like their tropical counterparts), while others brood, and release formed larvae (Roberts et al. 2009).

6.4.1.7 Carbonate Sands and Exposed Limestone

Boreen et al. (1993) reported that carbonate sands in the Otway middle shelf support a benthic fauna dominated by bryozoans, infaunal echinoids and assemblages of sponges. Other components include bivalves (commonly *Mysella donaciformis* and *Legrandina bernardi*), *Chlamys* sp. scallops and small gastropods. The sand octopus (*Octopus kaurna*) also inhabits sandy sediments. This description is broadly supported by video footage of the Otway pipeline, which also indicates that hard substrates in mid shelf areas in the west of the operational support low to medium density sponge dominated communities.

Within the inner shelf, Boreen et al. (1993) reported that the benthic communities associated with hard limestone substrates were comprised of sponges, encrustlng and branching corailine algae, poysonellid algae, bryozoa, benthic forams, robust sarpullds, brachiopods, bivalves, gastropods, fleshy red algae and kelp.

A benthic survey of inner shelf sediments in the vicinity of the Minerva Gas Field development, found the seafloor was composed of course, well-sorted sand (Currie and Jenkins 1994). This survey identified 196 species and a total of 5,035 individuals comprised of 63% crustaceans, 15% polychaetes, 8% molluscs and 5% echinoderms. The most abundant species were the bivalve *Katlysia* sp. (12.4 individuals/m^2), the sarconid *Triloculina affinis* (8.9 individuals/m^2), the tanaid isopod *Apsuedes* sp. (8.3 individuals/m^2) and the spionid polychaete *Prionospio coorilla* (4.8 individuals/m^2) (Currie 1995).

Demersal fishes likely to be associated with carbonate sands on the middle and inner shelf include (LCC 1993) eastern stargazer (*Kathetostoma laeve*), elephant shark (*Callorhynchus milli*), greenback flounder (*Rhombosolea taoarina*), gummy shark (*Mustelus antarcticus*), long-snouted flounder (*Ammotretis rostraus*), saw shark (*Pristiophorus nudipinnis*), southern sand flathead (*Platycephalus bassensis*) and southern school whiting (*Sillago bassensis*).

6.4.1.8 Basalt Rises

No basalt rises were identified within the Operational or Planning Areas.

6.4.2 Mangroves

Mangroves grow in intertidal mud and sand, with specially adapted aerial roots (pneumatophores) that provide for gas exchange during low tide (McClatchie et al. 2006). Mangrove forests are important in helping stabilise coastal sediments, providing a nursery ground for many species of fish and crustacean, and providing shelter or nesting areas for seabirds (McClatchie et al. 2006).

The mangroves in Victoria are the most southerly extent of mangroves found in the world and are located mostly along sheltered sections of the coast within inlets or bays (MESA 2015). There is only one species of mangrove found in Victoria, the white or grey mangrove (*Avicennia marina*), which is known to occur at Western Port, which overlaps the Otway Planning Area. (Figure 6-27). Mangroves have also been recorded within the Bass Planning Area in New South Wales, including at Bermagui River, Meringo Creek and Wagonga Inlet (Figure 6-27).

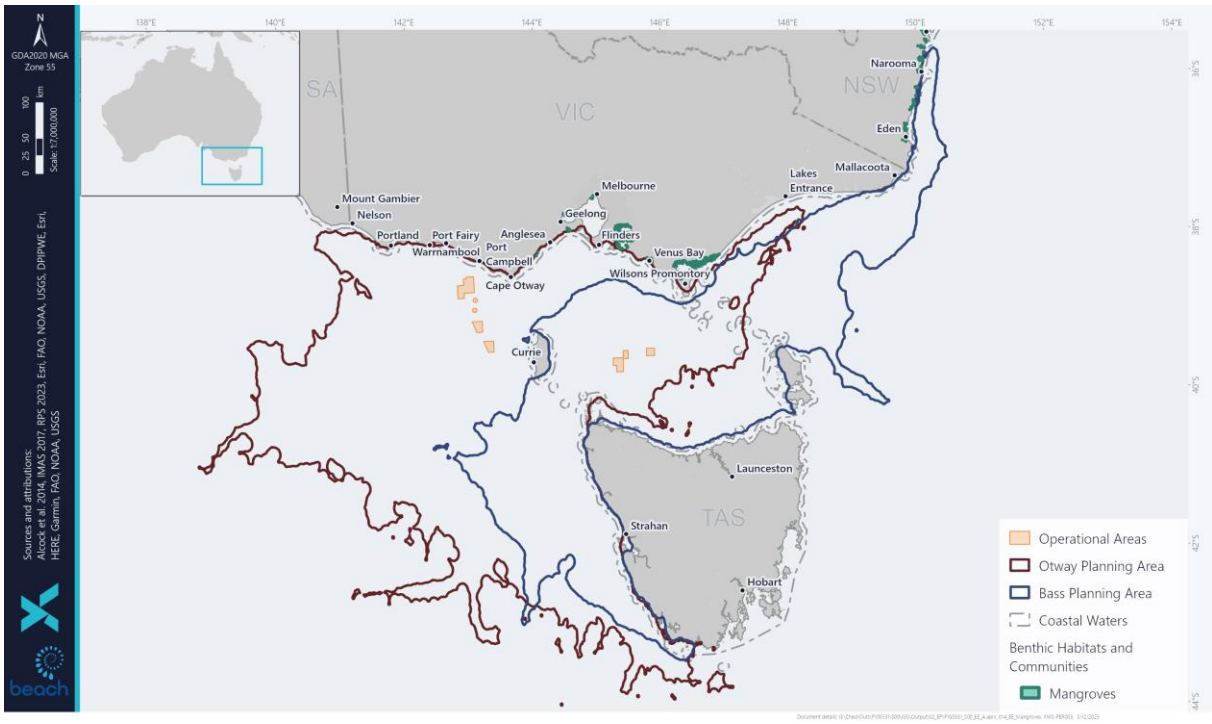


Figure 6-27: Presence of Mangrove Habitat within the Planning Areas

6.4.3 Saltmarsh

Saltmarshes are terrestrial halophytic (salt-adapted) ecosystems that mostly occur in the upper-intertidal zone and are widespread along the coast. Saltmarshes are typically dominated by dense stands of halophytic plants such as herbs, grasses and low shrubs. In contrast to mangroves, the

diversity of saltmarsh plant species increases with increasing latitude. The vegetation in these environments is essential to the stability of the saltmarsh, as they trap and bind sediments. The sediments are generally sandy silts and clays and can often have high organic material content. Saltmarshes provide a habitat for a wide range of both marine and terrestrial fauna, including infauna and epifaunal invertebrates, fish and birds.

Saltmarsh is found along many parts of the Victorian coast, although is most extensive in western Port Phillip Bay, northern Western Port, within the Corner Inlet-Nooramunga complex, and behind the sand dunes of Ninety Mile Beach in Gippsland (Figure 6-28Figure 6-28, Boon et al. 2011).

Within the Otway Planning Area, saltmarsh habitat has been mapped along the Victorian coastline including at 12 Apostles, Curdies Inlet, Port Phillip Bay and Thompson Creek (Figure 6-28). The Bass Planning Area overlaps several areas of recorded saltmarsh habitat along Flinders Island in Tasmania, eastern Victoria at the Gippsland Lakes and New South Wales including Baragoot Lake, Coila Lake and Nangudga Lake (Figure 6-28). Along the Tasmanian coastline, saltmarsh habitat has been mapped within the Planning Areas at King Island at Seal River and Yellow Rock River as well as the northern and western coasts of Tasmania including Arthur River, Henty River and Robbins Passage (Figure 6-28).

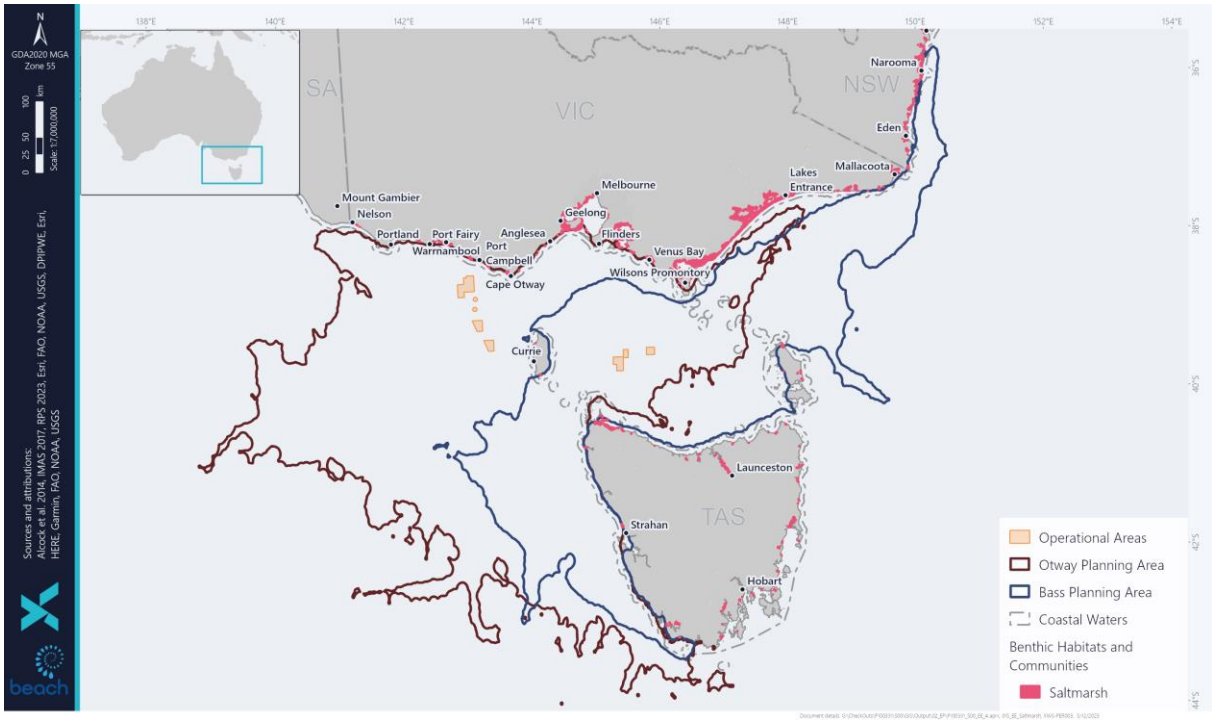


Figure 6-28: Presence of Saltmarsh Habitat within the Planning Areas

6.4.4 Plankton

Plankton species are the key component of the food web and support nearly all marine life. Copepods are the most common zooplankton and are some of the most abundant animals on earth. Plankton communities are highly diverse, with members from almost all phyla. Phytoplankton are photosynthetic organisms that drift with ocean currents and are mostly microscopic; however, some gelatinous plankton can be up to 2 m in diameter. Phytoplankton is grazed by zooplankton such as small protozoa, copepods, decapods, krill, and gelatinous zooplankton.

The carrying capacity of marine ecosystems (the mass of fish resources) and recruitment of individual stocks is strongly related to plankton abundance, timing, and composition. In the Planning Areas, the seasonal Bonney coast upwelling is a productivity hotspot, with high densities of zooplankton and are important for fish and whales. Of importance in the region is krill, *Nyctiphanes australis*, which swarms throughout the water column reaching its highest abundance in shallow waters of the continental shelf during nightly vertical migrations, primarily in the summer months (Hosie 1983). During winter months, *N. australis* abundance decreases and becomes relatively scarce in the upper water column. *N. australis* feeds on microalgae and provides an important link in the food chain, particularly for the blue whale. The fisheries in this region account for half of Australia's total annual catch and the main fishery in the region is sardine, which feeds on plankton, illustrating the interdependence of the fishing industry on plankton.

There have been relatively few studies of plankton populations in the Otway and Bass Strait regions, with most concentrating on zooplankton. Watson and Chaloupka (1982) reported a high diversity of zooplankton in eastern Bass Strait, with over 170 species recorded. However, Kimmerer and McKinnon (1984) reported only 80 species in their surveys of western and central Bass Strait.

Plankton distribution is dependent upon prevailing ocean currents including the East Australia Current, flows into and from Bass Strait and Southern Ocean water masses. Plankton distribution in the Planning Areas is expected to be highly variable both spatially and temporally and are likely to comprise characteristics of tropical, southern Australian, central Bass Strait and Tasman Sea distributions.

6.4.5 Invertebrates

There is a very large number of marine invertebrates in deep waters around Australia. Knowledge of the species in different habitats is extremely patchy; the number of deep-water benthic fauna is large but almost unknown. Throughout the region, a variety of seabed habits support a range of animal communities such as sparse sponges to extensive 'thickets" of lace corals and sponges, polychaete worms and filter feeders (DNP 2013).

Characteristics of large species of crustacea, such as lobster, prawn, and crab, which are significant commercial species in southern Australia, are well known. Mollusc species, such as oysters, scallops and abalone are also commercially fished, and their biology and abundance are well known. Major fisheries for the blacklip and to a lesser extent, greenlip abalone and scallops have been founded. The cooler waters of southern Australia also support the Maori octopus (*Macroctopus maorum*) commercial fishery, which is one of the largest octopuses in Australia (with arm spans longer than 3 m and weighing more than 10 kg. Other molluscs are abundant in southern Australia and Tasmania such as the sea-slug with more than 500 species. Volutes and cowries represent a relic fauna in southern Australia, with several species being very rare and can be highly sought after by collectors.

Echinoderms, such as sea stars, sea urchins and sea cucumbers are also an important fauna species of the southern Australian and Tasmanian waters, with several species at risk of extinction (DPIPWE 2016).

Sponge gardens are most commonly found in low light environments on reefs more than 20 m deep, and on rubble in areas where currents aren't very strong. These habitats flourish in deeper waters or shaded areas because they do not require much light, unlike algae and seagrass. The Bass Strait sponge beds area was identified as one of the 11 unique areas based on reports of large sponge catches in southern Bass Strait, taken on Museum Victoria research cruises conducted between 1979-

1983 to assess the marine biodiversity of Bass Strait. Limited further research has been done into the sponge beds in the Bass Strait, but it is assumed that the area has high biodiversity value based on surveys of other sponge beds elsewhere. (Butler et al. 2002).

Studies by the Museum of Victoria found that invertebrate diversity was high in southern Australian waters although the distribution of species was patchy, with little evidence of any distinct biogeographic regions (Wilson and Poore 1987). Results of sampling in shallower inshore sediments reported high diversity and patchy distribution (Parry et al. 1990). In these areas, crustaceans, polychaetes, and molluscs were dominant.

6.4.6 Threatened Ecological Communities

Threatened Ecological Communities (TECs) provide wildlife corridors or refugia for many plant and animal species, and listing a TEC provides a form of landscape or systems-level conservation (including threatened species).

TECs identified in the PMST Reports are presented in Figure 6-29 and Table 6-15 (Appendix E). TECs identified in the PMST Report due to the size of the grids used in the PMST but not actually intersecting a Planning Area are listed in the Table with 'X'. TECs which intersect a Planning Area and have a coastal component which may be exposed to hydrocarbons from a spill event are discussed in the subsections below.

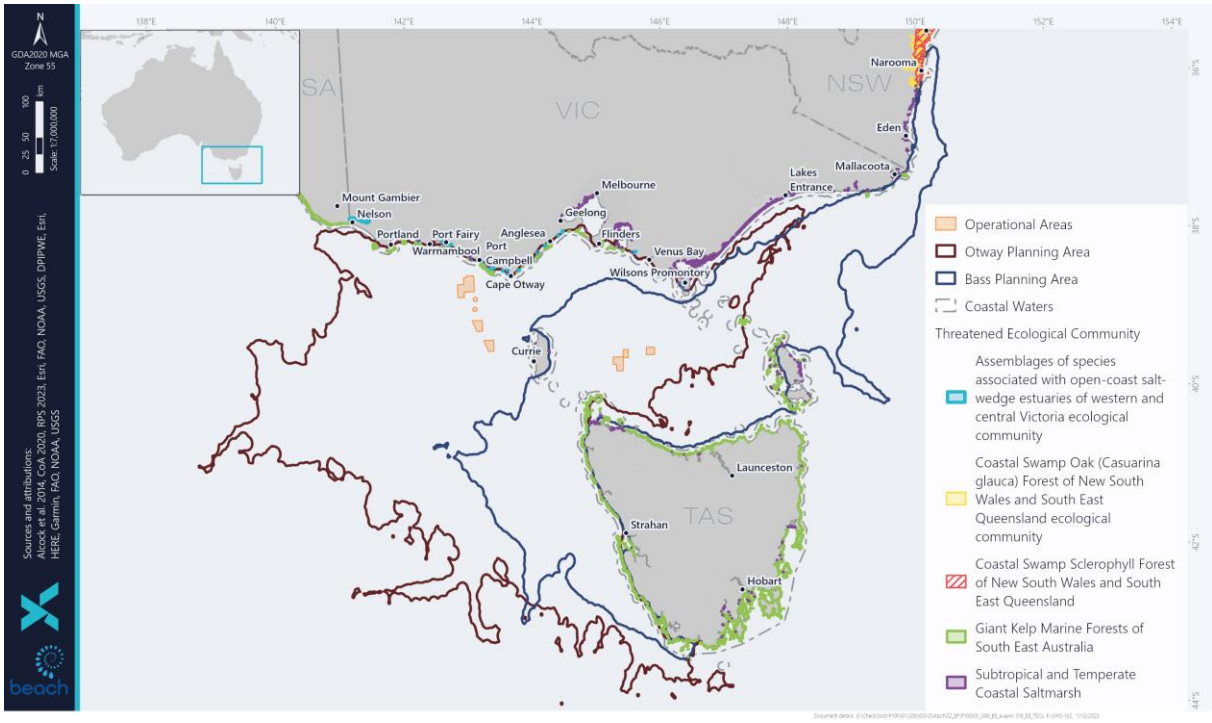


Figure 6-29: Threatened Ecological Communities within the Planning Areas

Table 6-15 Threatened Ecological Communities within the Planning Areas

Threatened Ecological Community	Threatened Category	Coastal Component	Planning Area	
			Bass	Otway
Alpine Sphagnum Bogs and Associated Fens	Endangered	-	✓	X
Araluen Scarp Grassy Forest	Endangered	-	✓	-
Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community	Endangered	✓	-	✓
Brogo Vine Forest of the South East Corner Bioregion	Endangered	-	✓	-
Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community	Endangered	✓	✓	-
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	✓	✓	-
Giant Kelp Marine Forests of South East Australia	Endangered	✓	✓	✓
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	Critically Endangered	-	-	✓
Illawarra and south coast lowland forest and woodland ecological community	Critically Endangered	-	✓	-
Karst springs and associated alkaline fens of the Naracoorte Coastal Plain Bioregion	Endangered	-	-	✓
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically Endangered	-	✓	-
Lowland Grassy Woodland in the South East Corner Bioregion	Critically Endangered	-	✓	-
Lowland Native Grasslands of Tasmania	Critically Endangered	-	✓	✓
Natural Damp Grassland of the Victorian Coastal Plains	Critically Endangered	-	-	✓
Natural Temperate Grassland of the Victorian Volcanic Plain	Critically Endangered	-	-	✓
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Critically Endangered	-	✓	-
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically Endangered	-	-	✓
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	✓	✓	✓

Threatened Ecological Community	Threatened Category	Coastal Component	Planning Area	
			Bass	Otway
Tasmanian Forests and Woodlands dominated by black gum or Brookers gum (*Eucalyptus ovata / E. brookeriana*)	Critically Endangered	-	✓	✓
Tasmanian white gum (*Eucalyptus viminalis*) wet forest	Critically Endangered	-	✓	✓
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	-	-	✓

6.4.6.1 Assemblages of Species associated with Open-coast Salt-wedge Estuaries of Western and Central Victoria Ecological Community

This ecological community is the assemblage of native plants, animals and micro-organisms associated with the dynamic salt-wedge estuary systems that occur within the temperate climate, microtidal regime (< 2 m), high wave energy coastline of western and central Victoria. The ecological community currently encompasses 25 estuaries in the region defined by the border between South Australia and Victoria and the most southerly point of Wilsons Promontory (TSSC 2018).

Salt-wedge estuaries are usually highly stratified, with saline bottom waters forming a 'salt-wedge' below the inflowing freshwater layer of riverine waters. The dynamic nature of salt-wedge estuaries has important implications for their inherent physical and chemical parameters, and ultimately for their biological structure and ecological functioning. Some assemblages of biota are dependent on the dynamics of these salt-wedge estuaries for their existence, refuge, increased productivity, and reproductive success. The ecological community is characterised by a core component of obligate estuarine taxa, with associated components of coastal, estuarine, brackish, and freshwater taxa that may reside in the estuary for periods of time and/or utilise the estuary for specific purposes (e.g. reproduction, feeding, refuge, migration) (TSSC 2018).

6.4.6.2 Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland Ecological Community

This ecological community occurs in sub-tropical, sub-humid and temperate climate zones from Curtis Island in Queensland to Bermagui in southern NSW in coastal catchments, mostly at elevations less than 20 m above sea-level and typically within 30 km of the coast (TSSC 2018a). Typically, coastal swamp oak forest is found in association with other vegetation types such as coastal saltmarsh, mangroves, freshwater wetlands, littoral rainforests or swam sclerophyll forests in a mosaic of coastal communities. When ground water is more saline, like estuarine or coastal lake fringes, the ecological community is typically expressed as a low woodland or forest and the composition of the understory is likely to include saline tolerant (typically saltmarsh) species. Further, the vegetation of these communities provides a diverse habitat for a wide range of fauna, many of which are listed as conservation significant under government legislation (TSSC 2018a).

6.4.6.3 Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland

This ecological community is located between the Great Dividing Range and the coastline from Gladstone, Queensland to the south coast of NSW. The community includes any organisms typically associated with forested palustrine wetlands or swam forests, found in the temperate to subtropical coastal valleys of Australia's east coast and islands. It most commonly occurs within 20 km of the coast at elevations below 20 m above sea-level. Vegetation in the wetland system is governed by the hydrologic regime. Further, the coastal swamp sclerophyll forest can be found in, or as part of, nationally and internationally important wetlands. Notable species typically associated with these communities include waterbirds such as the Australian painted snipe, migratory waders like the great knot and the nationally listed green and golden bell frog (DAWE 2021)

6.4.6.4 Giant Kelp Marine Forests of South East Australia

Giant kelp (*Macrocystis pyrifera*) is a large brown algae that grows on rocky reefs in cold temperate waters off south east Australia. The kelp grows up from the sea floor 8 m below the sea surface and deeper, vertically toward the water surface. It is the foundation species of this TEC in shallow coastal

marine ecological communities. The kelp species itself is not protected, rather, it is communities of closed or semi-closed giant kelp canopy at or below the sea surface that are protected (TSSC 2012).

Giant kelp is the largest and fastest growing marine plant. Their presence on a rocky reef adds vertical structure to the marine environment that creates significant habitat for marine fauna, increasing local marine biodiversity. Species known to shelter within the kelp forests include weedy sea dragons (*Phyllopteryx taeniolatus*), six-spined leather jacket (*Mesuchenia freycineti*), brittle stars (ophiuroids), sea urchins, sponges, blacklip abalone (*Tosia* spp.) and southern rock lobsters (*Jasus edwardsii*). The large biomass and productivity of the giant kelp plants also provides a range of ecosystem services to the coastal environment.

Giant kelp requires clear, shallow water no deeper than approximately 35 m deep (TSSC 2012). They are photo-autotrophic organisms that depend on photosynthetic capacity to supply the necessary organic materials and energy for growth. O'Hara (in Andrew 1999) reported that giant kelp communities in Tasmanian coastal waters occur at depths of 5-25 m.

Figure 6-29 shows that the largest extent of giant kelp marine forests are along the Tasmanian coastline with patches around the Victorian coastline.

James et al. (2013) undertook extensive surveys of macroalgal communities along the Otway Shelf from Warrnambool to Portland in south-west Victoria. Sites were adjacent to shore or on offshore rocky reefs covering a depth range of 0 to 36 m water depth. These surveys did not locate giant kelp at any site but identified that other brown algae species (*Durvillaea*, *Ecklonia*, *Phyllospora*, *Cystophora*, and *Sargassum*) are prolific to around 20 m water depth. Brown algae tend to be replaced by red algae in deeper waters.

Surveys of the Arches Marine Sanctuary (Edmunds et al. 2010) and Twelve Apostles Marine National Park (Holmes et al. 2007 cited in Barton et al. 2012) have not located giant kelp. The species has been recorded in Discovery Bay National Park forming part of a mixed brown algae community (Ball and Blake 2007) (not part of the TEC), on basalt rocky reefs. An assemblage dominated by the species has been recorded from Merri Marine Sanctuary occupying a very small area (0.2 ha) of rocky reef (Barton et al. 2012).

6.4.6.5 Subtropical and Temperate Coastal Saltmarsh

The Subtropical and Temperate Coastal Saltmarsh TEC occurs in a relatively narrow strip along the Australian coast, within the boundary along 23°37′ latitude along the east coast and south from Shark Bay on the west coast (TSSC 2013). The community is found in coastal areas which have an intermittent or regular tidal influence. Figure 6-29 shows that from Corner Inlet to Marlo there is a substantial amount of subtropical and temperate coastal saltmarsh along the Victorian coastline, but only small patches mapped within the Otway Planning Area. The Bass Planning Area also overlaps a small patch of recorded subtropical and temperate coastal saltmarsh along the New South Wales coastline and north-west coast of Tasmania (Figure 6-29).

The coastal saltmarsh community consists mainly of salt-tolerant vegetation including grasses, herbs, sedges, rushes and shrubs. Succulent herbs, shrubs and grasses generally dominate, and vegetation is generally less than 0.5 m in height (Adam 1990). In Australia, the vascular saltmarsh flora may include many species, but is dominated by relatively few families, with a high level of endism at the species level.

The saltmarsh community is inhabited by a wide range of infaunal and epifaunal invertebrates and low and high tide visitors such as fish, birds and prawns (Adam 1990). It is often important nursery habitat for fish and prawn species. Insects are also abundance and an important food source for other fauna. The dominant marine residents are benthic invertebrates, including molluscs and crabs (Ross et al. 2009).

The coastal saltmarsh community provides extensive ecosystem services such as the filtering of surface water, coastal productivity and the provision of food and nutrients for a wide range of adjacent marine and estuarine communities and stabilising the coastline and providing a buffer from waves and storms. Most importantly, the saltmarshes are one of the most efficient ecosystems globally in sequestering carbon, due to the biogeochemical conditions in the tidal wetlands being conducive to long-term carbon retention. A concern with the loss of saltmarsh habitat is that it could release the huge pool of stored carbon to the atmosphere.

6.4.7 Threatened and Migratory Species

PMST Reports were generated for the Operational and Planning Areas to identify the listed Threatened and Migratory species that may be present (Appendix E). The Planning Areas encompass the smaller Operational Areas.

6.4.7.1 Marine Fauna of Conservation Significance

Under Part 13 of the EPBC Act, species can be listed as one, or a combination, of the following protection designations:

- Threatened (further divided into categories; extinct, extinct in the wild, critically endangered, endangered, vulnerable, conservation-dependent)
- Migratory
- Whale or other cetaceans
- Marine.

Details of listed fauna and their likely presence in the Operational or Planning Areas are provided in the following sections.

For the purpose of the EP, the following species are discussed in further detail:

- Species listed as threatened or migratory under the EPBC Act and known or likely to occur in the Operational or Planning Areas. Known and likely occurrence was determined from the PMST Report.
- Species that have a biologically important area (BIA). This was determined from the National Conservation Values Atlas (NCVA).
- Species undertaking biologically important behaviour such as breeding, foraging, resting or migration (DCCEEW 2023i). This was determined from the PMST Report.

6.4.7.2 Biologically Important Areas and Critical Habitat to the Survival of the Species

Biologically Important Areas are spatially, and temporally defined areas of the marine environment used by protected marine species for carrying out critical life functions (DCCEEW 2023h). BIAs are designated by identifying areas and times known or likely to be regularly or repeatedly used by individuals or aggregations of a single species, stock, or population for either reproduction, feeding, migration or resting (DCCEEW 2023h).

The Australian Government is currently in consultation with key stakeholders to conduct a review of BIAs, which includes updating the BIA designation framework and geospatial data for priority protected species including cetaceans, marine turtles, Australian sea lions, sharks, dugong, and seabirds (DCCEEW 2023h). Reconsideration of BIA designation and updates to geospatial data is ongoing. This EP uses the best available data at the time of writing, and Beach will review any new information available or changes in information as per the process described in Section 8.3.5.

CoA (2013) details that 'habitat critical to the survival of a species or ecological community' refers to areas that are necessary:

- For activities such as foraging, breeding, roosting, or dispersal.
- For the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)
- To maintain genetic diversity and long-term evolutionary development, or
- For the reintroduction of populations or recovery of the species or ecological community.

Such habitat may be but is not limited to: habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act.

Habitat critical to the survival of a species is listed in Table 6-16. No habitat critical to the survival of species was identified within the Operational Areas. BIAs and within the Operational and Planning Areas are detailed in and Table 6-17. Further details are provided in the relevant species sections.

Table 6-16: Habitat Critical to the Survival of a Species within the Planning Areas

Habitat Critical to the Survival of a Species	**Planning Area**	
	Bass	**Otway**
Shy Albatross *(Thalassarche cauta)* - Albatross Island, The Mewstone, Pedra Branca	✓	✓

Table 6-17: BIAs within the Planning Area

Receptor	Type of BIA	Operational Area		Planning Area	
		Bass	Otway	Bass	Otway
Birds					
Antipodean albatross	Foraging	-	✓	✓	✓
Australasian gannet	Foraging	-	-	✓	✓
	Aggregation	-	-	✓	✓
Black-browed albatross	Foraging	✓	✓	✓	✓
Black-faced cormorant	Breeding	-	-	✓	✓
	Foraging	-	-	✓	✓
Black petrel	Foraging	-	-	✓	-
Buller's albatross	Foraging	✓	✓	✓	✓
Campbell albatross	Foraging	✓	-	✓	✓
Common diving-petrel	Foraging	✓	✓	✓	✓
	Breeding	-	-	✓	✓
Crested tern	Breeding	-	-	✓	-
	Foraging	-	-	✓	-
Flesh-footed shearwater	Foraging	-	-	✓	-
Great-winged petrel	Foraging	-	-	✓	-
Indian yellow-nosed albatross	Foraging	✓	✓	✓	✓
Little penguin	Foraging	-	-	✓	✓
	Breeding	-	-	✓	✓
Northern giant petrel	Foraging	-	-	✓	-
Short-tailed shearwater	Foraging	✓	✓	✓	✓
	Breeding	-	-	✓	✓
Shy albatross	Breeding	-	-	✓	✓
	Foraging likely	✓	✓	✓	✓
Soft-plumaged petrel	Foraging	-	-	✓	✓
	Breeding	-	-	✓	✓
Sooty shearwater	Foraging	-	-	✓	✓
	Breeding	-	-	✓	✓
Southern giant petrel	Foraging	-	-	✓	-
Wandering albatross	Foraging	✓	✓	✓	✓
Wedge-tailed shearwater	Foraging	-	✓	✓	✓
	Breeding	-	-	✓	✓
White-capped albatross	Foraging	-	-	✓	-

Receptor	Type of BIA	Operational Area		Planning Area	
		Bass	Otway	Bass	Otway
White-faced storm petrel	Foraging	✓	-	✓	✓
	Breeding	-	-	✓	✓
White-fronted tern	Breeding	-	-	✓	-
	Foraging	-	-	✓	-
Wilson's storm petrel	Migration	-	-	✓	-
Fish					
Grey nurse shark	Foraging	-	-	✓	-
	Migration	-	-	✓	-
White shark	Breeding (nursery area)	-	-	✓	✓
	Foraging	-	-	✓	✓
Cetaceans					
Humpback whale	Foraging	-	-	✓	-
Indo-pacific/Spotted bottlenose dolphin	Breeding	-	-	✓	-
Pygmy blue whale	Foraging	✓	✓	✓	✓
	Foraging (annual high use area)	-	✓	✓	✓
	Known Foraging Area	-	✓	✓	✓
Southern right whale	Reproduction	-	-	✓	✓
	Migration	✓	✓	✓	✓

6.4.7.3 Fish

Fish species present in the Operational or Planning Areas are either pelagic (living in the water column) or demersal (benthic). Fish species inhabiting the region are largely cool temperate species, common within the South-east Marine Region. Table 6-18 details the listed fish species identified in the Operational and Planning Area PMST Reports (Appendix E).

Two fish species identified in the PMST Reports are freshwater species, dwarf galaxias and Yarra pygmy perch, and are not discussed further as they occur outside of the area potentially affected by the Drilling Program.

Threatened or migratory species that are likely or known to occur in the area or have an intercepting BIA with the Operational or Planning Areas are discussed more detail.

Seven species of fish are classed as conservation dependent which do not receive special protection, as they are not considered "matters of national environmental significance" under the EPBC Act.

Information on eels is also provided as Beach's consultation with the Eastern Maar Aboriginal Corporation for the previous Otway Project activities identified that they have interests regarding eels, and they are possibly present within the Planning Areas during migration and spawning seasons.

Table 6-18: Listed Fish Species identified in the Planning Areas

Common Name	Scientific Name	EPBC Status			Operational Area		Planning Area	
		Listed Threatened	Listed Migratory	Listed Marine	Bass	Otway	Bass	Otway
Fish								
Australian Grayling	*Prototroctes maraena*	Vulnerable	-	-	-	Species or species habitat may occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area
		National Recovery Plan for the *Prototroctes maraena* (Australian grayling) (Backhouse et al. 2008).						
Black Rockcod, Black Cod, Saddled Rockcod	*Epinephelus daemelii*	Vulnerable	-	-	-	-	Species or species habitat likely to occur within area	-
Blue Warehou	*Seriolella brama*	Conservation Dependent	-	-	Species or species habitat known to occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area
Eastern Dwarf Galaxias, Dwarf Galaxias	*Galaxiella pusilla*	Endangered	-	-	-	-	Species or species habitat known to occur within area	Species or species habitat known to occur within area
		Conservation Advice for *Galaxiella pusilla* (dwarf galaxias) (DCCEEW 2023m).						
Eastern Gemfish	*Rexea solandri (eastern Australian population)*	Conservation Dependent	-	-	-	-	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
Orange Roughy, Deep-sea Perch, Red Roughy	*Hoplostethus atlanticus*	Conservation Dependent	-	-	-	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
Red Handfish	*Thymichthys politus*	Critically Endangered	-	-	-	-	Species or species habitat may occur within area	Species or species habitat may occur within area
Southern Bluefin Tuna	*Thunnus maccoyii*	Conservation Dependent	-	-	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
Yarra Pygmy Perch	*Nannoperca obscura*	Endangered	-	-	-	-	-	Species or species habitat known to occur within area
		Conservation Advice for *Nannoperca obscura* (Yarra pygmy perch) (DCCEEW 2023n).						
Ziebell's Handfish, Waterfall Bay Handfish	*Brachiopsilus ziebelli*	Vulnerable	-	-	-	-	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
Sharks and Rays								
Giant Manta Ray	*Mobula birostris*	-	Migratory (as *Manta birostris*)	-	-	-	Species or species habitat known to occur within area	-
Grey Nurse Shark (east coast population)	*Carcharias taurus (east coast population)*	Critically Endangered	-	-	-	-	Congregation or aggregation known to occur within area	-
		Recovery Plan for the Grey Nurse Shark (*Carcharias taurus*) (DoE 2014).						
Harrisson's Dogfish, Endeavour Dogfish, Dumb Gulper Shark, Harrison's Deepsea Dogfish	*Centrophorus harrissoni*	Conservation Dependent	-	-	-	-	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
Little Gulper Shark	*Centrophorus uyato*	Conservation Dependent	-	-	-	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
Maugean Skate, Port Davey Skate	*Zearaja maugeana*	Endangered	-	-	-	-	Species or species habitat known to occur within area	Species or species habitat known to occur within area

Common Name	Scientific Name	EPBC Status			Operational Area		Planning Area	
		Listed Threatened	Listed Migratory	Listed Marine	Bass	Otway	Bass	Otway
Oceanic Whitetip Shark	*Carcharhinus longimanus*	-	Migratory	-	-	-	Species or species habitat may occur within area	Species or species habitat may occur within area
Porbeagle, Mackerel Shark	*Lamna nasus*	-	Migratory	-	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark	*Galeorhinus galeus*	Conservation Dependent	-	-	-	Species or species habitat may occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
Shortfin Mako, Mako Shark	*Isurus oxyrinchus*	-	Migratory	-	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
Whale Shark	*Rhincodon typus*	Vulnerable	Migratory	-	-	-	Species or species habitat may occur within area	Species or species habitat may occur within area
		Approved Conservation Advice for the *Rhincodon typus* (whale shark) (TSSC 2015a).						
White Shark, Great White Shark	*Carcharodon carcharias*	Vulnerable	Migratory	-	Species or species habitat known to occur within area	Species or species habitat known to occur within area	Breeding known to occur within area	Breeding known to occur within area
		Recovery Plan for the *Carcharodon carcharias* (white shark) (DSEWPaC 2013a).						
Pipefish, Seahorses, and Seadragons								
Australian Smooth Pipefish, Smooth Pipefish	*Lissocampus caudalis*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse	*Hippocampus abdominalis*	-	-	Listed	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Brushtail Pipefish	*Leptoichthys fistularius*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Bullneck Seahorse	*Hippocampus minotaur*	-	-	Listed	Species or species habitat may occur within area	-	Species or species habitat may occur within area	Species or species habitat may occur within area
Common Seadragon, Weedy Seadragon	*Phyllopteryx taeniolatus*	-	-	Listed	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish	*Histiogamphelus briggsii*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Deepbody Pipefish, Deep-bodied Pipefish	*Kaupus costatus*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish	*Syngnathoides biaculeatus*	-	-	Listed	-	-	Species or species habitat may occur within area	Species or species habitat may occur within area
Hairy Pipefish	*Urocampus carinirostris*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Halfbanded Pipefish	*Mitotichthys semistriatus*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Javelin Pipefish	*Lissocampus runa*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Knifesnout Pipefish, Knife-snouted Pipefish	*Hypselognathus rostratus*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Leafy Seadragon	*Phycodurus eques*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Longsnout Pipefish, Australian Long-snout	*Vanacampus poecilolaemus*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area

Common Name	Scientific Name	EPBC Status			Operational Area		Planning Area	
		Listed Threatened	Listed Migratory	Listed Marine	Bass	Otway	Bass	Otway
Pipefish, Long-snouted Pipefish								
Lord Howe Pipefish	*Cosmocampus howensis*	-	-	Listed	-	-	Species or species habitat may occur within area	-
Mollison's Pipefish	*Mitotichthys mollisoni*	-	-	Listed	-	-	Species or species habitat may occur within area	Species or species habitat may occur within area
Mother-of-pearl Pipefish	*Vanacampus margaritifer*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Port Phillip Pipefish	*Vanacampus phillipi*	-	-	Listed	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Pugnose Pipefish, Pug-nosed Pipefish	*Pugnaso curtirostris*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Red Pipefish	*Notiocampus ruber*	-	-	Listed	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish	*Histiogamphelus cristatus*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Ringback Pipefish, Ring-backed Pipefish	*Stipecampus cristatus*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Robust Ghostpipefish, Blue-finned Ghost Pipefish,	*Solenostomus cyanopterus*	-	-	Listed	-	-	Species or species habitat may occur within area	-
Robust Pipehorse, Robust Spiny Pipehorse	*Solegnathus robustus*	-	-	Listed	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Sawtooth Pipefish	*Maroubra perserrata*	-	-	Listed	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Short-head Seahorse, Short-snouted Seahorse	*Hippocampus breviceps*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Shortpouch Pygmy Pipehorse	*Acentronura tentaculata*	-	-	Listed	-	-	Species or species habitat may occur within area	-
Spiny Pipehorse, Australian Spiny Pipehorse	*Solegnathus spinosissimus*	-	-	Listed	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Spotted Pipefish, Gulf Pipefish, Peacock Pipefish	*Stigmatopora argus*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Trawl Pipefish, Bass Strait Pipefish	*Kimblaeus bassensis*	-	-	Listed	Species or species habitat may occur within area	-	Species or species habitat may occur within area	Species or species habitat may occur within area
Tucker's Pipefish	*Mitotichthys tuckeri*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish	*Heraldia nocturna*	-	-	Listed	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish	*Stigmatopora nigra*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area

Australian Grayling

The Australian grayling (*Prototroctes maraena*) is a dark brown to olive-green fish attaining 19 cm in length. The species typically inhabits the coastal streams of NSW, Victoria and Tasmania, migrating between streams and the ocean. Spawning occurs in freshwater, with timing dependant on many variables including latitude and temperature regimes. Most of its life is spent in fresh water, with parts of the larval or juvenile stages spent in coastal marine waters (DSE 2008), though its precise marine habitat requirements remain unknown (DSE 2008). They are a short-lived species, usually dying after their second year soon after spawning (a small proportion may reach four or five years) (DSE 2008).

The Australian grayling has been recorded from the Gellibrand River (DSE 2008), making it likely that it occurs in coastal waters. As marine waters are not part of the species' spawning grounds, the Operational Areas and Planning Areas are not likely to represent critical habitat for the species.

Black Rockcod

The black rockcod (*Epinephelus daemelii*) is listed as vulnerable and is a large marine groper or 'cod' species.

In Australia, the distribution of black rockcod ranges from southern Queensland through NSW to northern Victoria. However, records from Queensland and Victoria are rare, and the single specimen recorded from South Australian waters is considered a vagrant (DSEWPaC 2012c). The NSW coastline forms the species' main range, both in Australia and internationally. Black rockcod are known to occur to some degree in all six NSW Marine Parks – Lord Howe, Cape Byron, Solitary Island, Port Stephens, Jervis Bay and Batemans Bay (DSEWPaC 2012c).

Black rockcod generally inhabit near-shore rocky and offshore coral reefs at depths down to 50 m. In coastal waters adult black rockcod are found in rock caves, rock gutters and on rocky reefs (DSEWPaC 2012c). Black rockcod are an aggressive, territorial species and individuals may occupy one particular cave for most of their adult life.

Overfishing by commercial and recreational line fishers caused the first localised declines of the black rockcod in the early 1900s (DSEWPaC 2012c).

Red Handfish

The red handfish (*Thymichthys politus*) is endemic to south-eastern Tasmania and are currently only found in Primrose Sands Reed in Fredrick Genry Bay. Due to their rarity, small size and cryptic nature current population trends are difficult to determine (DoE and TG 2015). The inhabit a variety of locations, such as on top of rocks, amongst macro-algae, in sandy areas between rocks and reef sand interfaces at depths up to 20 m (DoE and TG 2015). They are small slow moving benthic fish that use their fins to crawl across the sea floor and have a of small crustaceans and polychaete worms.

The recovery plan for three handfish species, including the red handfish, identifies primary threats as habitat degradation and waterway pollution. Climate change and bioaccumulation of heavy metals are considered secondary threats. Due to the current population factors such as small population size, fragmented distribution and low dispersal these species have an increased risk of localised extinction as a result of stochastic events (DoE and TG 2015).

Ziebell's Handfish

Ziebell's handfish (*Brachiopsilus ziebelli*) is restricted to eastern and southern Tasmania in fragmented populations. The species is known from the Forestier Peninsula, Tasman Peninsula, Waterfall Bay and

Acton Islands occurring at depths between 10 and 20 m. Recent population studies have not been undertaken, and the extent and size of the handfish population is unknown. Ziebell's handfish is known to prefer soft bottomed habitats, however it is also found in giant kelp forests, on rocky substrates, and on rock ledges. Due to a lack of information and contemporary surveys of the handfish, threatening processes impacting species population size are unknown (DoE and TG 2015).

Eels

Ecology & Biology

The shortfinned eel (*Anguilla australis australis*) and the longfinned eel (*A. reinhardtii*) both occur naturally within Victoria and are the target species of the Victorian eel fishery (See Section 6.5.13). The eels have differing but overlapping distributions east and south of the Great Dividing Range in estuarine and freshwater catchments (VFA 2022b) (Figure 6-30).

The shortfinned eel is widespread across the southern parts of the Victoria and occurring occasionally in northern streams draining into the Murray River, while the longfinned eel is found within southeast parts of Victoria only (VFA 2022a). Both species spend the majority of their life cycle in fresh water or estuaries before travelling to the ocean to spawn once before dying (VFA 2022a). Shortfinned eels are listed as 'near threatened' on the IUCN red list, with barriers to riverine movement and freshwater habitat loss being key threats. Additionally changes in ocean currents, primary production, and thermal regimes may also affect eel migration, spawning success, and recruitment (Koster et al. 2021). The longfinned eel is listed as 'least concern' by the IUCN. Neither species are listed as threatened under the EPBC Act.

Both species of eel are primarily carnivorous, however, they will both opportunistically eat plant material (VFA 2022a, 2022c). The shortfinned eel is known to eat various types of fish, worms, insects, small crustaceans, molluscs, and water plants and can grow up to 1.1 m long and weigh up to 6.8 kg (VFA 2022a). The longfinned eel consumes primarily fish and insects The longfinned eel is larger in size compared to the shortfinned, reported to grow up to 2 m and weigh up to 16 kg, however, they are usually much smaller and often reach 1 m in length (VFA 2022c). Both species are believed to follow a seasonal feeding pattern, with the most intense feeding window being at night during summer and spring (VFA 2022a, 2022c). Both species sexes are determined by influences such as salinity, temperature, diet, and population density (more females as the population density decreases) (VFA 2017a).

Migration & Spawning

Both species of eel have a remarkable lifecycle that is not entirely understood, remaining a natural phenomenon. They spend most of their life cycle in freshwater or estuaries before undergoing a mass migration into the ocean, travelling in excess of 3,000 km to spawn once (VFA 2022b). Spawning location is believed to be in the Coral Sea near New Caledonia although no precise spawning location for either species has been identified (VFA 2022a). Both species migrate to the ocean once matured; male shortfinned eels generally mature at 8-12 years of age, whilst females mature at 10-20 years and longfinned eels can take double this time to mature. Migration occurs during late summer to autumn, and after a period of insatiable feeding and significant growth, the eels undergo a series of physical changes to prepare for their migration (VFA 2022a).

Once the eels are prepared for spawning, they move out of their freshwater environments into the ocean in total darkness and swim north against the current to reach the Coral Sea. By the time they arrive, they have used up all their energy resources then they spawn and die, and their young

commence the cycle over again. Their life begins at unknown spawning sites at a depth of 200 m as larvae. The pelagic larvae are then carried southwards by the ocean currents that parallel the east coast of Australia such as the EAC and swing east past Tasmania and then north to New Zealand. Along the way, they feed on microscopic organisms and develop into transparent, leaf-shaped larvae and eventually metamorphose into 'glass eels' which are eel-shaped, but extremely small and still transparent. At this stage, they move closer to land and commence migrating towards estuaries. Most shortfinned glass eels migrate in the winter and spring, while longfinned glass eels migrate during summer and autumn (VFA 2022a), although glass eels of both species may continue to arrive anytime throughout the year (VFA 2017).

Koster et al. (2021) tracked the shortfinned eel spawning migration for the first time in Australia. Sixteen eels were collected and tagged from the Hopkins and Fitzroy River estuaries as they migrated from the river mouths outwards to the Southern Ocean over a sandbar in 2019. They were then released at either Warrnambool Harbour, Hopkins mouth beach or Killarney beach. Of the 16 tags twelve returned data. The results showed that the shortfinned eels exhibit diel vertical migration, meaning they travel in the top layers of water during the night and travel further down in the water column during the day (Koster et al. 2021). Of the small number of eels that made the entire journey to the spawning location their last movements were recorded in the Coral Sea. Many of the eels (about 30%) migrations were cut short due to predation, suspected by sharks, tuna, or other marine mammals. The conclusion of the study talks about the need for further research to determine the eel's exact spawning locations and timing and how the information can be used to support conservation management, particularly when looking at anthropogenic impacts on the species. Koster et al. (2021) listed construction and operation of energy developments as having potential to interact with eel migration.

Victorian Eel Fishery

Both the longfinned and shortfinned eel are the target species for the Victorian eel fishery. The first commercial catches of eel were recorded in 1914, and up until 1950 eel was primarily fished for bait. Export of frozen shortfinned eel to Europe began in the 1960s (VFA 2022a). Eel are harvested in Victorian coastal river basins south of the Great Dividing Range using fyke nets, with a maximum of 18 licences allowed in Victoria. Certain waterways are closed to fishing to allow for eels to escape and spawn (VFA 2022a). Shortfinned eels are the most abundant and the most keenly targeted eel species in Victoria, productivity from the fishery is highly susceptible to short and long term and seasonal environmental variations, particularly drought (VFA 2017).

The eel fishery comprises both a wild catch sector and a culture (stock enhanced) sector. The culture sector has developed strategies for growth consistent with the species life cycle by translocating juvenile eels from other parts of Victoria into lakes and impoundments (culture waters) in western inland Victoria where they continue to grow (VFA 2017). Fishing for glass eels has been of limited success due to the highly variable abundance in Victoria. Most of Victoria's eel catch is taken by commercial fishers and is comprised of adult eels during different stages of their migration.

First Nations connection to eels

Eels were, and continue to be, an important resource for certain First Nation communities. Their use for communal gatherings and for barter and trade was extensive in pre-colonial times. Today, eel remains a popular food for community events (VFA 2017). Shortfinned eels in particular hold a cultural significance to First Nations people. For example, the Gunditjmara people of south-western Victoria built and used sophisticated aquaculture systems throughout the Budj Bim cultural landscape to

exploit eel migrations at least 7,000 years ago. These systems and their eel catches have since provided a lasting and sustainable economic and social base for the Gunditjmara society (Koster et al. 2021). The Budj Bim cultural landscape is outside of the Planning Area.

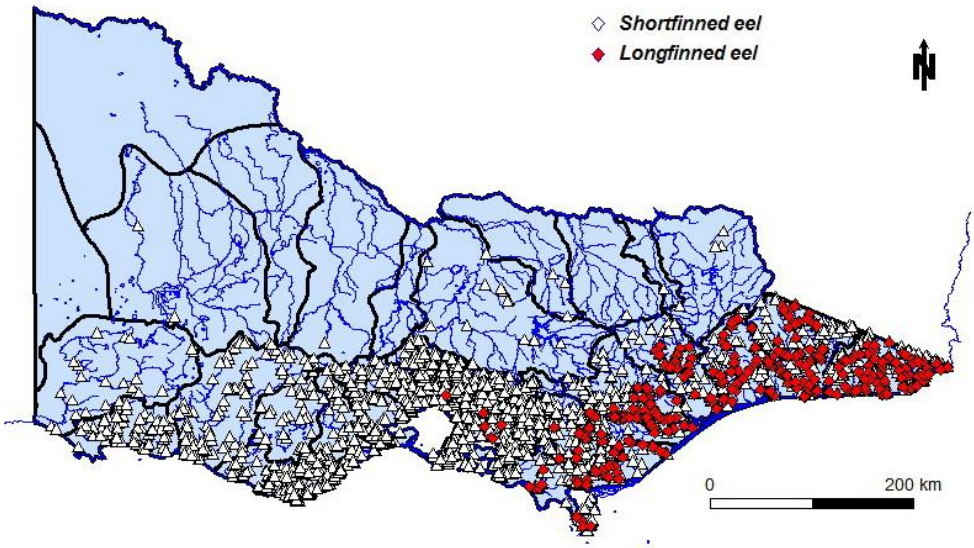


Figure 6-30: Distribution of Longfinned and Shortfinned Eels in Victoria (VFA 2017)

Giant Manta Ray

The giant manta ray is the world's largest ray species. The species is migratory, and many fragmented populations of the giant manta ray occur globally. Typically, this species is found in warm tropical, subtropical, and temperate bodies of water. The main threats to the species include overfishing and bycatch of the species as a result of commercial fishing (NOAA 2023).

Grey Nurse Shark

The grey nurse shark (*Carachariasmo taurus*) is widespread in most sub-tropical and cool temperate seas on the continental shelf, with separate east coast and west coast populations (DoE 2014). The east coast population extends from central Queensland to southern NSW, occasionally as far south as the NSW/Victoria border. Preferred habitat for grey nurse sharks is inshore rocky reefs or islands, generally aggregating near the seabed in water depths of 10 to 40 m in deep sandy or gravel filled gutters, or in rocky caves. The grey nurse shark feeds on a variety of bony fish, smaller sharks and rays, squid, crabs, and lobsters. The species has a gestational period of 9–12 months and females will birth 1 to 2 pups once every 2 years. Recent research shows that the grey nurse shark exhibits reproductive philanthropy meaning they return to specific nursery areas each year (Bray 2020). Foraging and migration BIAs for the grey nurse shark overlap the north-eastern extent of the Bass Planning Area (Figure 6-31).

The recovery plan for the grey nurse shark identifies primary threats to the species as accidental mortality and injury arising from interactions with commercial and recreational fishing activities and mortality related to shark control activities such as meshing or drum lining (DoE 2014).

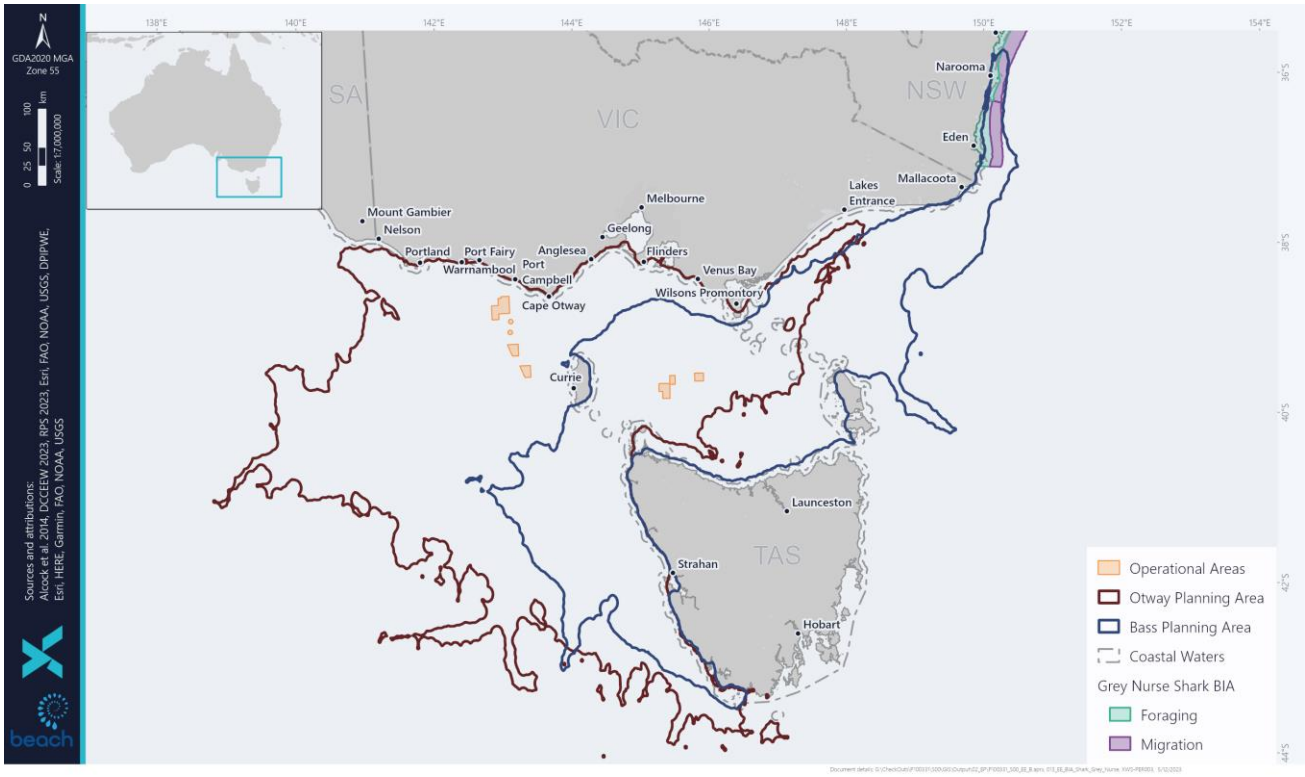


Figure 6-31: Grey Nurse Shark BIAs within the Planning Areas

Port Davey Skate

The Port Davey skate or Maugean skate (*Zearaja maugeana*) is known from both Macquarie Harbour and Port Davey Harbour in south-west Tasmania. The species inhabits low-nutrient, brackish water between 5 and 7 m deep. Preferred habitat are soft surface benthic areas. These habitats are thought to be relatively stable in terms of both light and nutrient levels. The skate is a dark brown, medium-sized primitive skate. Threats to the Port Davey skate include historical heavy metal pollution from mining operations, fish capture, and changes to the nutrient composition of waters by vessel and sewerage discharges, and land-use modifications in the form of catchment damning (DCCEEW 2023j).

Porbeagle Shark

The porbeagle shark (*Lamna nasus*) is widely distributed in the southern waters of Australia including Victorian and Tasmanian waters. The species preys on bony fishes and cephalopods and is an opportunistic hunter that regularly moves up and down in the water column, catching prey in mid-water as well as at the seafloor. It is most commonly found over food-rich banks on the outer continental shelf, but does make occasional forays close to shore or into the open ocean, down to depths of approximately 1,300 m. It also conducts long-distance seasonal migrations, generally shifting between shallower and deeper water (Pade et al. 2009). The porbeagle shark is likely to be present in the Planning Areas in low numbers.

Shortfin Mako Shark

The shortfin mako shark (*Isurus oxyrinchus*) is a pelagic species with a circum-global oceanic distribution in tropical and temperate seas (Mollet et al. 2000). It is widespread in Australian waters, commonly found in water with temperatures greater than 16°C. Populations of the shortfin mako are considered to have undergone a substantial decline globally. These sharks are a common by-catch species of commercial fisheries (Mollet et al. 2000).

The use of dorsal satellite tags on 10 juvenile shortfin mako sharks captured in the Great Australian Bight between 2008 and 2011 investigated habitat and migration patterns. It revealed Great Australian Bight and south east of Kangaroo Island near the norther extent of the Bonney coast upwelling region, to be areas of highest fidelity and indicating critical habitats for juvenile shortfin mako (Rogers 2011). The tagged sharks also showed migration to south west Western Australia, Victoria, Bass Strait and south west of Tasmania. Stomachs of shortfin mako sharks were also analysed from specimens collected by game fishing competitors in Port Mac Donnell, South Australia and Portland, Victoria from 2008 and 2010 found they specialise in larger prey including pelagic teleosts and cephalopods (Rogers 2011). Due to their widespread distribution in Australian waters, shortfin mako sharks are likely to be present in the Operational Areas and Planning Areas in low numbers.

Whale shark

The whale shark (*Rhincodon typus*) is most commonly seen in waters off Western Australia, Northern Territory and Queensland however is occasionally seen off Victoria and South Australia (DoE 2023a). It is generally found in areas where the surface temperature is 21–25°C, preferably with cold water of 17°C or less upwelling into it. It is generally observed singularly at the surface but can occasionally be in schools or aggregations of up to hundreds of sharks (Compagno 1984). The whale shark is a suction filter feeder and feeds on a variety of planktonic and nektonic prey, including small crustaceans, small schooling fishes and, to a lesser extent, on small tuna and squid. The whale shark (*Rhincodon typus*) is listed as Vulnerable and Migratory under the EPBC Act (TSSC 2015a) and may be present in the Planning Areas in low numbers.

White shark

The white shark (*Carcharodon carcharias*) is widely distributed and located throughout temperate and sub-tropical waters with their known range in Australian waters including all coastal areas except the Northern Territory (DoE 2023b). Studies of white sharks indicate that they are largely transient. However, individuals are known to return to feeding grounds on a seasonal basis (Klimley and Anderson, 1996). In the Australasian region, white sharks differ genetically from other populations and data suggest there are two populations in southern Australia east and west by Bass Strait (Blower et al. 2012). A recent long-term electronic tagging study of juvenile white sharks off eastern Australia, indicated complex movement patterns over thousands of kilometres, including annual fidelity to spatially restricted nursery areas, directed seasonal coastal movements, intermittent areas of temporary nearshore residency and offshore movement into the Tasman Sea (Bruce et al. 2019). This study also supported the two-population model for the species in Australian waters with restricted east to west movements through Bass Strait. Bruce et al. (2019) observed seasonal movements of juvenile white sharks being in the northern region during winter–spring (June–November) and southern region during summer–autumn (December–May).

Observations of adult sharks are more frequent around fur-seal and sea lion colonies, including Wilsons Promontory and the Skerries. Juveniles are known to congregate in certain key areas including the Ninety Mile Beach area (including Corner Inlet and Lakes Entrance) in eastern Victoria and the Portland area of western Victoria).

Breeding and foraging BIAs overlap the Planning Areas while the Operational Areas overlap the known distribution BIA (Figure 6-32). The known distribution is on the coastal shelf/upper slope waters out to 1000 m and the broader area where they are likely to occur extends from Barrow Island in WA to Yeppoon in New South Wales (NSW). They are more likely to be found between the 60–120 m depth contours than in the deeper waters. There is a known nursery area at Corner Inlet, and they are known

to forage in waters off pinniped colonies throughout the South-east Marine Region. It is likely that white sharks are present in the Operational and Planning Areas.

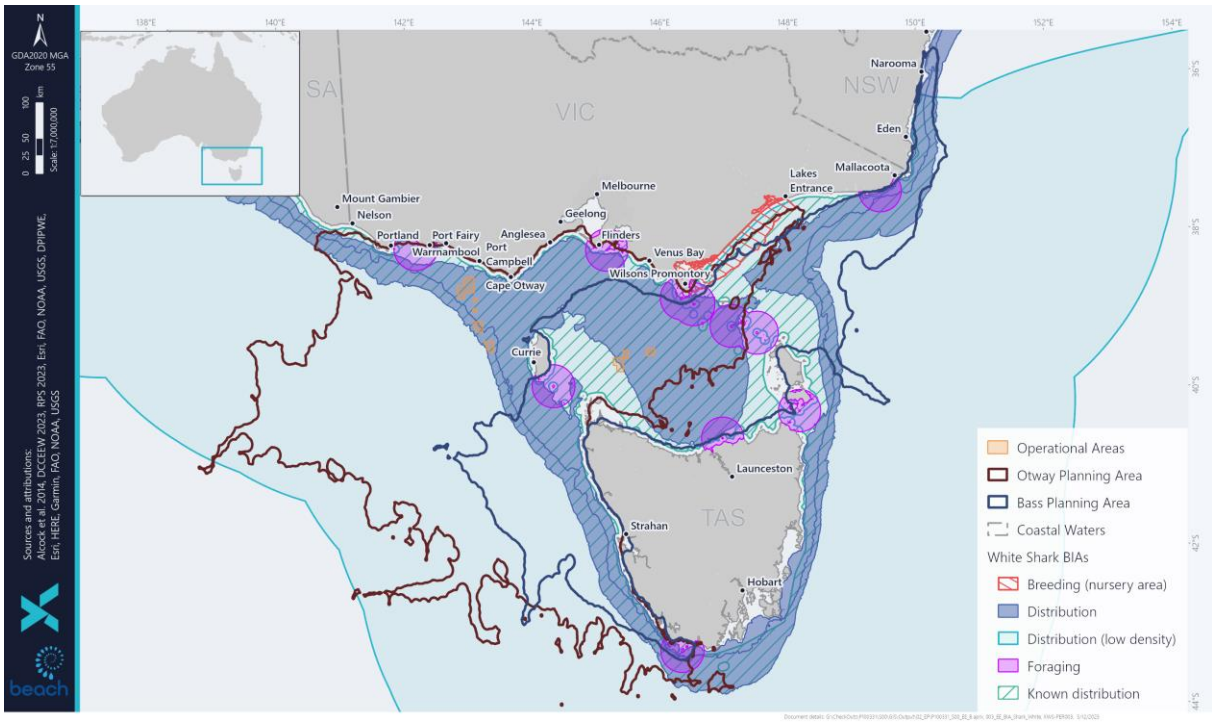


Figure 6-32: BIAs for the White Shark within the Operational and Planning Areas

Syngnathids

All of the marine ray-finned fish species identified in the EPBC PMST Report are syngnathids, which includes seahorses and their relatives (sea dragon, pipehorse and pipefish). The majority of these fish species are associated with seagrass meadows, macroalgal seabed habitats, rocky reefs and sponge gardens located in shallow, inshore waters (e.g., protected coastal bays, harbours, and jetties) less than 50 m deep (Fishes of Australia 2015). They are sometimes recorded in deeper offshore waters, where they depend on the protection of sponges and rafts of floating seaweed such as sargassum.

Of the 33 species of syngnathids identified in the EPBC PMST Report, only one (*Hippocampus abdominalis*, big-belly seahorse) has a documented species profile and threats profile, indicating how little published information exists in general regarding syngnathids. The PMST Report species profile and threats profiles indicate that the syngnathid species listed in the Operational and Planning Areas are widely distributed throughout southern, south-eastern and south-western Australian waters.

6.4.7.4 Birds

A diverse array of seabirds and terrestrial birds utilise the Bass Strait and Otway regions and may potentially forage within or fly over the Operational or Planning Areas, resting on islands during their migration. Infrequently and often associated with storm events, birds that do not normally cross the ocean are sometimes observed over the Bass Strait and Otway shelf, suggesting the birds have been blown off their normal course or are migrating.

Bird species listed in the PMST reports are displayed in Table 6-19. Threatened or migratory species that are likely or known to occur in or have an intercepting BIA with the Operational or Planning Areas are discussed in more detail.

The following conservation and recovery plans apply to birds with conservation and recovery plans and conservation advice relevant to individual species are detailed in Table 6-19.

National Recovery Plan for Albatrosses and Petrels 2022 (CoA 2022a). The recovery plan is a co-ordinated conservation strategy for albatrosses and giant petrels listed as threatened. Threats identified relevant to the activity:

- Marine pollution - Minimise the effects of marine debris, plastics and pollution.
- Marine debris - Minimise the effects of marine debris, plastics and pollution.
- Artificial lighting – no specific actions relevant to the activity.
- Climate variability and change - no specific actions relevant to the activity.

Wildlife Conservation Plan for Migratory Shorebirds – 2015 (DoE 2015b). The long-term recovery plan objective for migratory shorebirds is to minimise anthropogenic threats to allow for the conservation status of these bird species. Threats identified relevant to the activity:

- Anthropogenic disturbance – artificial lighting.
- Habitat degradation/ modification - oil pollution).
- Climate variability and change.

Wildlife Conservation Plan for Seabirds (CoA 2020a). The Plan aims to provide a national framework for the research and management of listed marine and migratory seabirds and to outline national activities to support the conservation of listed seabirds in Australia and beyond. The Plan includes a summary of Australia's commitments under international conventions and agreements, and the identification of important habitats within Australia.

Threats identified relevant to the activity:

- Climate change
- Resource extraction
- Marine debris
- Light pollution
- Acute pollution – oil spills, discharges

With the action of manage the effects of anthropogenic disturbance to seabird breeding and roosting areas.

Table 6-19: Listed Bird Species identified in the Operational and Planning Areas

Common Name	Scientific Name	EPBC Status			Operational Area		Planning Area	
		Listed Threatened	Listed Migratory	Listed Marine	Bass	Otway	Bass	Otway
Albatrosses								
Antipodean Albatross	*Diomedea antipodensis*	Vulnerable	Migratory	Listed	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area
Black-browed Albatross	*Thalassarche melanophris*	Vulnerable	Migratory	Listed	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area
Buller's Albatross, Pacific Albatross	*Thalassarche bulleri*	Vulnerable	Migratory	Listed	Species or species habitat may occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area
Campbell Albatross, Campbell Black-browed Albatross	*Thalassarche impavida*	Vulnerable	Migratory	Listed	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area
Chatham Albatross	*Thalassarche eremita*	Endangered	Migratory	Listed	-	-	Foraging, feeding or related behaviour may occur within area	Foraging, feeding or related behaviour may occur within area
Gibson's Albatross	*Diomedea antipodensis gibsoni*	Vulnerable	-	Listed (as *Diomedea gibsoni*)	Foraging, feeding or related behaviour likely to occur within area	-	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area
Grey-headed Albatross	*Thalassarche chrysostoma*	Endangered	Migratory	Listed	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Indian Yellow-nosed Albatross	*Thalassarche carteri*	Vulnerable	Migratory	Listed	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
Northern Buller's Albatross, Pacific Albatross	*Thalassarche bulleri platei*	Vulnerable	-	Listed (as *Thalassarche* sp. nov.)	Species or species habitat may occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area
Northern Royal Albatross	*Diomedea sanfordi*	Endangered	Migratory	Listed	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area
Salvin's Albatross	*Thalassarche salvini*	Vulnerable	Migratory	Listed	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area
Shy Albatross	*Thalassarche cauta*	Endangered	Migratory	Listed	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Breeding known to occur within area	Breeding known to occur within area
Sooty Albatross	*Phoebetria fusca*	Vulnerable	Migratory	Listed	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
Southern Royal Albatross	*Diomedea epomophora*	Vulnerable	Migratory	Listed	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area
Wandering Albatross	*Diomedea exulans*	Vulnerable	Migratory	Listed	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area
White-capped Albatross	*Thalassarche steadi*	Vulnerable	Migratory	Listed	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area
Shearwaters								
Flesh-footed Shearwater, Fleshy-footed Shearwater	*Ardenna carneipes*	-	Migratory	Listed (as *Puffinus carneipes*)	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Species or species habitat known to occur within area
Short-tailed Shearwater	*Ardenna tenuirostris*	-	Migratory	Listed (as *Puffinus tenuirostris*)	-	-	Breeding known to occur within area	Breeding known to occur within area

Common Name	Scientific Name	EPBC Status			Operational Area		Planning Area	
		Listed Threatened	Listed Migratory	Listed Marine	Bass	Otway	Bass	Otway
Sooty Shearwater	*Ardenna grisea*	Vulnerable	Migratory	Listed (as *Puffinus griseus*)	Species or species habitat may occur within area	Species or species habitat may occur within area	Breeding known to occur within area	Breeding known to occur within area
		Conservation Advice for *Ardenna grisea* (sooty shearwater) (DCCEEW 2023l).						
Wedge-tailed Shearwater	*Ardenna pacifica*	-	Migratory	Listed (as *Puffinus pacificus*)	-	-	Breeding known to occur within area	-
Petrels								
Blue Petrel	*Halobaena caerulea*	Vulnerable	-	Listed	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
		Approved Conservation Advice for the *Halobaena caerulea* (blue petrel) (TSSC 2015e).						
Common Diving-Petrel	*Pelecanoides urinatrix*	-	-	Listed	-	-	Breeding known to occur within area	Breeding known to occur within area
Gould's Petrel, Australian Gould's Petrel-	*Pterodroma leucoptera leucoptera-*	Endangered	-	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Breeding known to occur within area	Species or species habitat may occur within area
		National Recovery Plan for *Pterodroma leucoptera leucoptera* (Gould's petrel) (DEC NSW 2006).						
Kermadec Petrel (western)	*Pterodroma neglecta neglecta*	Vulnerable	-	-	-	-	Foraging, feeding or related behaviour may occur within area	-
Northern Giant Petrel	*Macronectes halli*	Vulnerable	Migratory	Listed	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area
Soft-plumaged Petrel	*Pterodroma mollis*	Vulnerable	-	Listed	Species or species habitat may occur within area	Species or species habitat may occur within area	Breeding known to occur within area	Breeding known to occur within area
		Approved Conservation Advice for *Pterodroma mollis* (soft-plumaged petrel) (TSSC 2015c).						
Southern Giant-Petrel, Southern Giant Petrel	*Macronectes giganteus*	Endangered	Migratory	Listed	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area
White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian)	*Fregetta grallaria grallaria*	Vulnerable	-	-	Species or species habitat likely to occur within area	-	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
White-faced Storm-Petrel	*Pelagodroma marina*	-	-	Listed	-	-	Breeding known to occur within area	Breeding known to occur within area
White-necked Petrel	*Pterodroma cervicalis*	-	-	Listed	-	-	Species or species habitat may occur within area	-
Seabird								
Australian Fairy Tern	*Sternula nereis nereis*	Vulnerable	-	-	Foraging, feeding or related behaviour likely to occur within area	-	Species or species habitat known to occur within area	Species or species habitat known to occur within area
		National Recovery Plan for the Australian Fairy Tern (*Sternula nereis nereis*). (CoA 2020b).						
Black-faced Cormorant	*Phalacrocorax fuscescens*	-	-	Listed	-	-	Breeding known to occur within area	Breeding known to occur within area
Brown Skua	*Stercorarius antarcticus*	-	-	Listed (as *Catharacta skua*)	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Cape Gannet	*Morus capensis*	-	-	Listed	-	-	-	Breeding known to occur within area
Caspian Tern	*Hydroprogne caspia*	-	Migratory	Listed (as *Sterna caspia*)	-	-	Breeding known to occur within area	Breeding known to occur within area

Common Name	Scientific Name	EPBC Status			Operational Area		Planning Area	
		Listed Threatened	Listed Migratory	Listed Marine	Bass	Otway	Bass	Otway
Fairy Prion	*Pachyptila turtur*	-	-	Listed	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area
Fairy Prion (southern)	*Pachyptila turtur subantarctica*	Vulnerable	-	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area
		Approved Conservation Advice for *Pachyptila subantarctica* (fairy prion (southern)) (TSSC 2015d).						
Fairy Tern	*Sternula nereis*	-	-	Listed (as Sterna nereis)	-	-	Breeding known to occur within area	Breeding known to occur within area
Greater Crested Tern	*Thalasseus bergii*	-	Migratory	Listed (as *Sterna bergii*)	-	-	Breeding known to occur within area	Breeding known to occur within area
Little Penguin	*Eudyptula minor*	-	-	Listed	-	-	Breeding known to occur within area	Breeding known to occur within area
Little Tern	*Sternula albifrons*	-	Migratory	Listed (as *Sterna albifrons*)	-	-	Breeding known to occur within area	Breeding known to occur within area
Shorebirds								
Australasian Bittern	*Botaurus poiciloptilus*	Endangered	-	-	-	-	Species or species habitat known to occur within area	Species or species habitat known to occur within area
		Conservation Advice *Botaurus poiciloptilus* (Australasian bittern) (TSSC 2019). National Recovery Plan for the Australasian Bittern (*Botaurus poiciloptilus*) (DCCEEW 2022)						
Australasian Gannet	*Morus serrator*	-	-	Listed	-	-	-	Breeding known to occur within area
Australian Painted Snipe	*Rostratula australis*	Endangered	-	Listed - overfly marine area (as *Rostratula benghalensis* (*sensu lato*))	-	-	Species or species habitat known to occur within area	Species or species habitat known to occur within area
		National Recovery Plan for the Australian Painted Snipe (*Rostratula australis*) (CoA 2022).						
Alaskan Bar-tailed Godwit	*Limosa lapponica baueri*	Endangered			-	-	Species or species habitat known to occur within area	Species or species habitat known to occur within area
		Conservation Advice *Limosa lapponica baueri* (Alaskan bar-tailed godwit) (DCCEEW 2024d).						
Bar-tailed Godwit	*Limosa lapponica*	-	Migratory	Listed - overfly marine area	-	-	Species or species habitat known to occur within area	Species or species habitat known to occur within area
Black-tailed Godwit	*Limosa limosa*	Endangered-	Migratory	Listed - overfly marine area	-	-	Roosting known to occur within area	Roosting known to occur within area
		Conservation Advice for *Limosa limosa* (black-tailed godwit) (DCCEEW 2024c).						
Broad-billed Sandpiper	*Limicola falcinellus*	-	Migratory	Listed - overfly marine area	-	-	-	Roosting known to occur within area
Common Greenshank, Greenshank	*Tringa nebularia*	Endangered	Migratory	Listed - overfly marine area	-	-	Species or species habitat known to occur within area	Species or species habitat known to occur within area
		Conservation Advice for *Tringa nebularia* (common greenshank) (DCCEEW 2024a)						
Common Noddy	*Anous stolidus*	-	Migratory	Listed	-	-	-	Species or species habitat likely to occur within area
Common Sandpiper	*Actitis hypoleucos*	-	Migratory	Listed	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area
Curlew Sandpiper	*Calidris ferruginea*	Critically Endangered	Migratory	Listed - overfly marine area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area
		Conservation Advice *Calidris ferruginea* (curlew sandpiper) (DoE 2015e).						
Double-banded Plover	*Charadrius bicinctus*	-	Migratory	Listed - overfly marine area	-	-	Roosting known to occur within area	Roosting known to occur within area

Common Name	Scientific Name	EPBC Status			Operational Area		Planning Area	
		Listed Threatened	Listed Migratory	Listed Marine	Bass	Otway	Bass	Otway
Eastern Hooded Plover, Eastern Hooded Plover	*Thinornis cucullatus cucullatus*	Vulnerable	-	Listed - overfly marine area (as *Thinornis rubricollis rubricollis*)	-	-	Species or species habitat known to occur within area	Species or species habitat known to occur within area
Eastern Curlew, Far Eastern Curlew	*Numenius madagascariensis*	Critically Endangered	Migratory	Listed	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area
		Conservation Advice for *Numenius madagascariensis* (eastern curlew) (DoE 2015e).						
Great Knot	*Calidris tenuirostris*	Vulnerable	Migratory	Listed - overfly marine area	-	-	Roosting known to occur within area	Roosting known to occur within area
		Conservation Advice for *Calidris tenuirostris* (great knot) (DCCEEW 2024f).						
Greater Sand Plover, Large Sand Plover	*Charadrius leschenaultii*	Vulnerable	Migratory	Listed	-	-	Species or species habitat known to occur within area	Species or species habitat known to occur within area
		Conservation Advice for *Charadrius leschenaultia* (greater sand plover) (TSSC 2016b).						
Grey Plover	*Pluvialis squatarola*	Vulnerable	Migratory	Listed - overfly marine area	-	-	Roosting known to occur within area	Roosting known to occur within area
		Conservation Advice for *Pluvialis squatarola* (grey plover) (DCCEEW 2024b).						
Hooded Plover, Hooded Dotterel	*Thinornis cucullatus*	-	-	Listed - overfly marine area (as *Thinornis rubricollis*)	-	-	Species or species habitat known to occur within area	Species or species habitat known to occur within area
Latham's Snipe, Japanese Snipe	*Gallinago hardwickii*	Vulnerable	Migratory	Listed - overfly marine area	-	-	Species or species habitat known to occur within area	Species or species habitat known to occur within area
		Conservation Advice for *Gallinago hardwickii* (Latham's snipe) (DCCEEW 2024e).						
Lesser Sand Plover, Mongolian Plover	*Charadrius mongolus*	Endangered	Migratory	Listed	-	-	Roosting known to occur within area	Roosting known to occur within area
Little Curlew, Little Whimbrel	*Numenius minutus*	-	Migratory	Listed - overfly marine area	-	-	Roosting likely to occur within area	Roosting likely to occur within area
Marsh Sandpiper, Little Greenshank	*Tringa stagnatilis*	-	Migratory	Listed - overfly marine area	-	-	Species or species habitat known to occur within area	Roosting known to occur within area
Oriental Plover, Oriental Dotterel	*Charadrius veredus*	-	Migratory	Listed - overfly marine area	-	-	-	Species or species habitat known to occur within area
Pacific Golden Plover	*Pluvialis fulva*	-	Migratory	Listed	-	-	Roosting known to occur within area	Roosting known to occur within area
Pectoral Sandpiper	*Calidris melanotos*	-	Migratory	Listed - overfly marine area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat likely to occur within area	Species or species habitat known to occur within area
Pied Stilt, Black-winged Stilt	*Himantopus himantopus*	-	-	Listed - overfly marine area	-	-	Roosting known to occur within area	Roosting known to occur within area
Red-capped Plover	*Charadrius ruficapillus*	-	-	Listed - overfly marine area	-	-	Roosting known to occur within area	Roosting known to occur within area
Red-necked Avocet	*Recurvirostra novaehollandiae*	-	-	Listed - overfly marine area	-	-	Species or species habitat known to occur within area	Roosting known to occur within area
Red-necked Stint	*Calidris ruficollis*	-	Migratory	Listed - overfly marine area	-	-	Roosting known to occur within area	Roosting known to occur within area
Red-necked Phalarope	*Phalaropus lobatus*	-	Migratory	Listed	-	-	-	Roosting known to occur within area
Red Knot, Knot	*Calidris canutus*	Vulnerable	Migratory	Listed - overfly marine area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area
		Conservation Advice for Calidris canutus (red knot) (DCCEEW 2024g).						

Common Name	Scientific Name	EPBC Status			Operational Area		Planning Area	
		Listed Threatened	Listed Migratory	Listed Marine	Bass	Otway	Bass	Otway
Ruddy Turnstone	*Arenaria interpres*	Vulnerable	Migratory	Listed	-	-	Roosting known to occur within area	Roosting known to occur within area
		Conservation Advice for *Arenaria interpres* (ruddy turnstone) (DCCEEW 2024i).						
Ruff (Reeve)	*Philomachus pugnax*	-	Migratory	Listed - overfly marine area	-	-	Roosting known to occur within area	Roosting known to occur within area
Sanderling	*Calidris alba*	-	Migratory	Listed	-	-	Roosting known to occur within area	Roosting known to occur within area
Sharp-tailed Sandpiper	*Calidris acuminata*	Vulnerable	Migratory	Listed	Species or species habitat may occur within area	Species or species habitat may occur within area	Roosting known to occur within area	Roosting known to occur within area
		Conservation Advice for *Calidris acuminata* (sharp-tailed sandpiper) (DCCEEW 2024h).						
Silver Gull	*Chroicocephalus novaehollandiae*	-	-	Listed (as *Larus novaehollandiae*)	-	-	Breeding known to occur within area	Breeding known to occur within area
Sooty Tern	*Onychoprion fuscatus*	-	-	Listed (as *Sterna fuscata*)	-	-	Breeding known to occur within area	Breeding known to occur within area
Swinhoe's Snipe	*Gallinago megala*	-	Migratory	Listed - overfly marine area	-	-	Roosting likely to occur within area	Roosting likely to occur within area
Terek Sandpiper	*Xenus cinereus*	Vulnerable	Migratory	Listed - overfly marine area	-	-	Roosting known to occur within area	Roosting known to occur within area
		Conservation Advice for *Xenus cinereus* (terek sandpiper) (DCCEEW 2024)						
Wandering Tattler	*Tringa incana*	-	Migratory	Listed (as *Heteroscelus incanus*)	-	-	-	Roosting known to occur within area
Whimbrel	*Numenius phaeopus*	-	Migratory	Listed	-	-	Roosting known to occur within area	Roosting known to occur within area
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	-	-	Listed	-	-	Breeding known to occur within area	Breeding known to occur within area
White-fronted Tern	*Sterna striata*	-	-	Listed	Foraging, feeding or related behaviour likely to occur within area	Migration route may occur within area	Breeding known to occur within area	Foraging, feeding or related behaviour likely to occur within area
White-tailed Tropicbird	*Phaethon lepturus*	-	Migratory	Listed	-	-	Species or species habitat may occur within area	-
Wood Sandpiper	*Tringa glareola*	-	Migratory	Listed - overfly marine area	-	-	Species or species habitat known to occur within area	Roosting known to occur within area
Other Species								
Black Currawong (King Island)	*Strepera fuliginosa colei*	Vulnerable	-	-	-	-	Breeding likely to occur within area	Breeding likely to occur within area
Black-eared Cuckoo	*Chalcites osculans*	-	-	Listed - overfly marine area (as *Chrysococcyx osculans*)	-	-	-	Species or species habitat known to occur within area
Black-faced Monarch	*Monarcha melanopsis*	-	Migratory	Listed - overfly marine area	-	-	Species or species habitat known to occur within area	Species or species habitat known to occur within area
Blue-winged Parrot	*Neophema chrysostoma*	Vulnerable	-	Listed - overfly marine area	-	-	Species or species habitat known to occur within area	Species or species habitat known to occur within area
Brown Treecreeper (south-eastern)	*Climacteris picumnus victoriae*	Vulnerable	-	-	-	-	Species or species habitat known to occur within area	Species or species habitat may occur within area
Cattle Egret	*Bubulcus ibis*	-	-	Listed - overfly marine area (as *Ardea ibis*)	-	-	Species or species habitat may occur within area	Species or species habitat may occur within area
Diamond Firetail	*Stagonopleura guttata*	Vulnerable	-	-	-	-	Species or species habitat known to occur within area	Species or species habitat known to occur within area
Eastern Bristlebird	*Dasyornis brachypterus*	Endangered	-	-	-	-	Species or species habitat known to occur within area	-

Common Name	Scientific Name	EPBC Status			Operational Area		Planning Area	
		Listed Threatened	Listed Migratory	Listed Marine	Bass	Otway	Bass	Otway
Fork-tailed Swift	*Apus pacificus*	-	Migratory	Listed - overfly marine area	-	-	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
Forty-spotted Pardalote	*Pardalotus quadragintus*	Endangered	-	-	-	-	Species or species habitat known to occur within area	-
		Approved Conservation Advice for *Pardalotus quadragintus* (forty-spotted pardalote) (TSSC 2016c).						
Gang-gang Cockatoo	*Callocephalon fimbriatum*	Endangered	-	-	-	-	Species or species habitat known to occur within area	Species or species habitat known to occur within area
Green Rosella (King Island)	*Platycercus caledonicus brownii*	Vulnerable	-	-	-	-	Species or species habitat known to occur within area	Species or species habitat known to occur within area
Grey Falcon	*Falco hypoleucos*	Vulnerable	-	-	-	-	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
Grey-tailed Tattler	*Tringa brevipes*	-	Migratory	Listed (as *Heteroscelus brevipes*)	-	-	Roosting known to occur within area	Roosting known to occur within area
Kelp Gull	*Larus dominicanus*	-	-	Listed	-	-	Breeding known to occur within area	Breeding known to occur within area
King Island Brown Thornbill, Brown Thornbill (King Island)	*Acanthiza pusilla magnirostris*	Endangered	-	-	-	-	Species or species habitat known to occur within area	Species or species habitat known to occur within area
King Island Scrubtit, Scrubtit (King Island)	*Acanthornis magna greeniana*	Critically Endangered	-	-	-	-	Species or species habitat known to occur within area	Species or species habitat known to occur within area
Magpie Goose	*Anseranas semipalmata*	-	-	Listed - overfly marine area	-	-	-	Species or species habitat may occur within area
Masked Owl (Tasmanian)	*Tyto novaehollandiae castanops (Tasmanian population)*	Vulnerable	-	-	-	-	Breeding known to occur within area	Breeding known to occur within area
		Approved Conservation Advice for *Tyto novaehollandiae castanops* (Tasmanian Masked Owl) (TSSC 2010)						
Orange-bellied Parrot	*Neophema chrysogaster*	Critically Endangered	-	Listed - overfly marine area	Migration route likely to occur within area		Breeding known to occur within area	Breeding known to occur within area
		National Recovery Plan for the Orange-bellied Parrot, *Neophema chrysogaster (*DELWP 2016).						
Oriental Cuckoo, Horsfield's Cuckoo	*Cuculus optatus*	-	Migratory	-	-	-	Species or species habitat may occur within area	-
Osprey	*Pandion haliaetus*	-	Migratory	Listed	-	-	Species or species habitat known to occur within area	Species or species habitat known to occur within area
Pacific Gull	*Larus pacificus*	-	-	Listed	-	-	Breeding known to occur within area	Breeding known to occur within area
Painted Honeyeater	*Grantiella picta*	Vulnerable	-	-	-	-	Species or species habitat known to occur within area	Species or species habitat known to occur within area
Pilotbird	*Pycnoptilus floccosus*	Vulnerable	-	-	-	-	Species or species habitat known to occur within area	Species or species habitat known to occur within area
Plains-wanderer	*Pedionomus torquatus*	Critically Endangered	-	-	-	-	-	Species or species habitat may occur within area
		Conservation Advice *Pedionomus torquatus* plains-wanderer (DoE 2015c). National Recovery Plan for the Plains-wanderer (*Pedionomus torquatus*) DoE and Govt SA DoEWNR 2016).						
Rainbow Bee-eater	*Merops ornatus*	-	-	Listed - overfly marine area	-	-	Species or species habitat may occur within area	Species or species habitat may occur within area
Regent Honeyeater	*Anthochaera phrygia*	Critically Endangered	-	-	-	-	Species or species habitat known to occur within area	Foraging, feeding or related behaviour likely to occur within area

Common Name	Scientific Name	EPBC Status			Operational Area		Planning Area	
		Listed Threatened	Listed Migratory	Listed Marine	Bass	Otway	Bass	Otway
		Conservation Advice *Anthochaera phrygia* regent honeyeater (DoE 2015g)						
Rufous Fantail	*Rhipidura rufifrons*	-	Migratory	Listed - overfly marine area	-	-	Species or species habitat known to occur within area	Species or species habitat known to occur within area
Satin Flycatcher	*Myiagra cyanoleuca*	-	Migratory	Listed - overfly marine area	-	-	Breeding known to occur within area	Breeding known to occur within area
South-eastern Glossy Black-Cockatoo	*Calyptorhynchus lathami lathami*	Vulnerable	-	-	-	-	Species or species habitat known to occur within area	Species or species habitat may occur within area
South-eastern Hooded Robin, Hooded Robin (south-eastern)	*Melanodryas cucullata cucullata*	Endangered	-	-	-	-	Species or species habitat may occur within area	Species or species habitat may occur within area
South-eastern Red-tailed Black-Cockatoo	*Calyptorhynchus banksii graptogyne*	Endangered	-	-	-	-	-	Species or species habitat likely to occur within area
Southern Whiteface	*Aphelocephala leucopsis*	Vulnerable	-	-	-	-	Species or species habitat may occur within area	Species or species habitat known to occur within area
Spectacled Monarch	*Symposiachrus trivirgatus*	-	Migratory (as Monarcha trivirgatus)	Listed - overfly marine area (as *Monarcha trivirgatus*)	-	-	Species or species habitat known to occur within area	-
Swift Parrot	*Lathamus discolor*	Critically Endangered	-	Listed - overfly marine area	-	-	Breeding known to occur within area	Species or species habitat known to occur within area
		National Recovery Plan for the Swift Parrot *Lathamus discolour* (Saunders and Tzaros 2011).						
Tasmanian Azure Kingfisher	*Ceyx azureus diemenensis*	Endangered	-	-	-	-	Breeding known to occur within area	Breeding known to occur within area
Tasmanian Wedge-tailed Eagle, Wedge-tailed Eagle (Tasmanian)	*Aquila audax fleayi*	Endangered	-	-	-	-	Breeding likely to occur within area	Breeding likely to occur within area
White-throated Needletail	*Hirundapus caudacutus*	Vulnerable	Migratory	Listed - overfly marine area	-	-	Species or species habitat known to occur within area	Species or species habitat known to occur within area
Yellow Wagtail	*Motacilla flava*	-	Migratory	Listed - overfly marine area	-	-	Species or species habitat known to occur within area	Species or species habitat known to occur within area

Albatross and Petrels

Albatrosses and giant-petrels are among the most dispersive and oceanic of all birds, spending more than 95% of their time foraging at sea in search of prey and usually only returning to land (remote islands) to breed. Only seven species of albatross and the southern and northern giant petrel are known to breed within Australia, which are protected under the National Recovery Plan for Albatrosses and Petrels (CoA 2022a). Breeding within Australian territory occurs on the isolated islands of Antarctica (Giganteus Island, Hawker Island and Frazier islands) and the Southern Ocean (Heard Island, McDonald Island, Macquarie Island, Bishop, and Clerk Islands), as well as islands off the south coast of Tasmania and Albatross Island off the north-west coast of Tasmania in Bass Strait (DSEWPaC 2011b).

Albatross and giant petrel species exhibit a broad range of diets and foraging behaviours, hence their at-sea distributions are diverse. Combined with their ability to cover vast oceanic distances, all waters within Australian jurisdiction can be considered foraging habitat, however the most critical foraging habitat is those waters south of 25 degrees where most species spend most of their foraging time. The Antipodean albatross, black-browed albatross, Buller's albatross, Campbell albatross, common diving-petrel, great-winged petrel, Indian yellow-nosed albatross, northern giant petrel, shy albatross, soft-plumaged petrel, southern giant petrel, wandering albatross, white-capped albatross and white-faced storm petrel have BIAs for foraging that overlap the Planning Area (Figure 6-33, Figure 6-34, Figure 6-35 and Figure 6-36). These BIAs cover either most or all the South-east Marine Region. Therefore, it is likely that these species will be present and forage in the Operational and Planning Areas. The Chatham albatross, Gibson's albatross, grey-headed albatross, northern Buller's albatross, northern royal albatross, Salvin's albatross, southern royal albatross, blue petrel, Gould's petrel, Kermadec petrel (western) have biologically important behaviours identified within the PMST Report that occur within either the Operational or Planning Area.

The shy albatross breeds on three offshore islands adjacent to Tasmania: Albatross Island, the Mewstone and Pedra Branca. These three areas are regarded as habitats critical to the survival of the threatened species (CoA 2022a) and are within the Planning Areas.

The Antipodean albatross is recognised as a conservation value in the South-east and Temperate East Marine Region (CoA 2015a, DSEWPaC 2012d). It is a sub-species of the wandering albatross. It breeds on islands in the New Zealand subantarctic with egg-laying during the austral summer and fledging from December to March (ACAP 2023). The species forages in all areas of the South-east Marine Region, excluding Bass Strait, and feeds primarily on cephalopods, fish and crustaceans (BirdLife International 2009, Gales 1998). The South-east Marine Region, excluding Bass Strait, is recognised as a foraging BIA for the species and overlaps the Planning Areas (Figure 6-33).

The black-browed albatross is recognised as a conservation value in the South-east and Temperate East Marine Region (CoA 2015a, DSEWPaC 2012d). It has a circumpolar distribution and is found over Antarctic, subantarctic and sub-tropical waters (CoA 2015a). Breeding populations occur on Macquarie Island, adjacent Bishop and Clerk Islets, as well as locations outside the South East region at Heard Island and McDonald Islands (Australian external territory) (Figure 6-33). Black-browed albatross breed annually, with the breeding season beginning in September and fledging in April to May. In southern Australia, black-browed albatrosses mainly forage along the southern coasts from Perth to Sydney (Marchant and Higgins 1990, Reid et al. 2002). The majority of black-browed albatrosses seen in south-eastern Australian waters between October and January are immature birds (Reid et al. 2002), probably coming from Indian Ocean and Southern Georgian breeding colonies. Sub-adults are observed in

Australian waters all year round. The entire South-east Marine Region is recognised as a foraging BIA for the species and overlaps the Planning Areas (Figure 6-33)

Buller's albatross is recognised as a conservation value in the South-east Marine Region (CoA 2015a). This species breeding is endemic to New Zealand, but it forages across the South Pacific, in general, adults forage between 40–50°S from Tasmania eastwards to the Chatham Rise (NZ), while juveniles and non-breeding adults disperse across the South Pacific Ocean to the coast of South America (BirdLife International 2004, DSEWPaC 2011b). This species is mainly present around Tasmania from January to July (DCCEEW 2023i). Satellite tracking studies of this species from the Snares and Solander Islands (NZ) (Sagar and Weimerskirch 1996; Stahl and Sagar 2006) have shown that during much of the breeding season birds forage in New Zealand waters. However, both breeding adults and juveniles and non-breeding adults also forage around Tasmania. A foraging BIA occurs for this species in the South-east Marine Region and overlaps the Planning Areas (Figure 6-33).

Campbell albatross is a sub-species of black-browed albatross and is recognised as a conservation value in the South-east and Temperate East Marine Region (CoA 2015a, DSEWPaC 2012d). The Campbell albatross is endemic to Campbell Island (New Zealand subantarctic) and breeds annually from early August to May (ACAP 2023). Juveniles appear to migrate north and disperse through the subtropics in winter, including along the eastern coast of Australia (ACAP 2023). During winter, adults are found widely dispersed around the Tasman Sea and the south-western Pacific Ocean east of New Zealand, whereas in summer the distribution of both breeding and non-breeding birds is more restricted and southerly (32°S to 44°S) (Waugh et al. 1999). The Campbell albatross feeds on krill and fish, with some cephalopods, salps and jellyfish. The entire South-east Marine Region is recognised as a foraging BIA for the species and overlaps the Planning Area (Figure 6-33).

The Chatham albatross is a small to medium size albatross and recognised as a conservation value in the South-east Marine Region (CoA 2015a). This endangered species is endemic to the Chatham Islands in New Zealand and breeds annually on Chatham during late August to December. This species travels in higher latitudes of the Pacific Ocean to South America. Australia is within the foraging range of the Chatham albatross (CoA 2022). Foraging, feeding or related behaviour may occur within the Planning Area.

The Gibson's albatross is recognised as a conservation value in the South-east Marine Region (CoA 2015a). This vulnerable species has been recorded foraging between Coffs Harbour in NSW and in Wilson's Promontory in Victoria. Males and females have been recorded using different foraging areas with females frequenting the Tasman Sea (40° S), while the males disperse in western area at lower latitudes or north-east towards the mid Pacific Ocean. This species is rarely observed in the Pacific or Indian Ocean, with the only Australian record occurring in Wollongong. This albatross visits Australian wasters during non-breeding seasons with breeding occurring in New Zealand. Foraging usually occurs between 30° and 50°S (DoE 2024j). Foraging, feeding or related behaviour is likely to occur within the Operational and Planning Area.

The Indian yellow-nosed albatross is recognised as a conservation value in the South-east and Temperate East Marine Region (CoA 2015a, DSEWPaC 2012d). It breeds on the French subantarctic islands and on South Africa's Prince Edward Islands (ACAP 2023). At-sea records indicate that, for the non-breeding range, birds disperse from their breeding islands and commonly occur off southern Africa and Australia (ACAP 2023). Recent satellite tracking data shows that, during the winter months this species occurs throughout the South-east Marine Region as far south as latitude 45ºS (Delord and

Weimerskirch 2011) during winter months. The Planning Areas overlap the foraging BIA within the South-east Marine Region (Figure 6-34).

The northern Buller's albatross (*Thalassarche bulleri platei*) is a subspecies of the Buller's albatross (*Thalassarche bulleri*). This smaller albatross is a non-breeding visitor to Australia who forages mostly in the Pacific Ocean and the Tasman Sea, although birds have been recorded on the east coast of the mainland of Australia. This species breeds only on Chatham and Three Kings Island in New Zealand (DoE 2024k). The northern Buller's albatross is likely to have foraging and feeding behaviour occur within the Operational and Planning Area.

The northern royal albatross is recognised as a conservation value in the South-east Marine Region (CoA 2015a). This endangered species is endemic to New Zealand and breeds only on New Zealand islands. It is a biennial breeder and visits southern and sub-Antarctic Australian waters during non-breeding seasons traversing widely over the Southern Ocean and feeding regularly in Tasmanian and Southern Australian waters. The northern royal albatross has a circumpolar distribution of higher latitudes spanning from 30°-52°S (CoA 2022). Foraging, feeding or related behaviour is likely to occur within the Operational and Planning Area.

Salvin's albatross is recognised as a conservation value in the South-east Marine Region (CoA 2015a). This vulnerable species is endemic to New Zealand and breeds only on New Zealand islands. Australian waters are within the foraging range of Salvin's albatross which it visits during non-breeding seasons (CoA 2022). Foraging, feeding or related behaviour is likely to occur within the Operational and Planning Area.

The shy albatross is recognised as a conservation value in the South-east Marine Region (CoA 2015a). It is the only endemic Australian albatross species, and breeds on Albatross Island, Bass Strait, and the Mewstone and Pedra Branca (Figure 6-34), off southern Tasmania in the Tasmanian Wilderness World Heritage Area (Gales 1998, Alderman et al. 2010). The species breeds annually, laying eggs in September and fledging chicks in April (Gales 1998). Shy albatrosses are less oceanic than many other albatross species, are usually found over the continental shelf, and regularly venture close to shore along the coasts of Tasmania and southern Australia (CoA 2022). Habitats critical for the shy albatross include breeding grounds at Albatross Island, Bass Strait, Mewstone and Pedra Branca and there is a breeding BIA around Albatross Island within the Planning Areas in addition to the foraging likely BIA which encompasses the South-east Marine Region (Figure 6-34).

The southern royal albatross is recognised as a conservation value in the South-east Marine Region (CoA 2015a). Endemic to New Zealand, this species has four breeding sites located in the sub-Antarctic Islands of New Zealand. It is a biennial breeder and visits Australian waters to forage during non-breeding seasons. This albatross has a circumpolar range in the higher altitudes of the southern hemisphere between 30-55°S including sub-Antarctica Australia and the Australian Antarctic Territory (CoA 2022). Foraging, feeding or related behaviour is likely to occur within the Operational and Planning Area.

The wandering albatross is recognised as a conservation value in the South-east and Temperate East Marine Region (CoA 2015a, DSEWPaC 2012d). It breeds on six sub-Antarctic island groups (Marchant and Higgins 1990, ACAP 2023). The wandering albatross breeds biennially, laying eggs in December and fledging chicks between mid-November and late February. In Australian waters, a very small population breeds on Macquarie Island, which is outside the Planning Areas (ACAP 2023). Limited

satellite tracking of wandering albatross from Macquarie Island shows that breeding females forage north of the Island in waters off southern Tasmania, while males forage in open waters of the Southern Ocean, south of 50°S, reflecting a spatial segregation seen in other populations of this species. Juveniles are concentrated in lower latitudes north and east of Macquarie Island in Pacific waters, off the south east coast of Australia and in New Zealand waters. Wandering albatross feed in the Southern Ocean (Nicholls et al. 1997) mainly on squid and fish but also crustaceans and carrion (Marchant and Higgins 1990). Foraging trips by breeding wandering albatross have exceeded 15,200 km between incubation bouts (Jouventin and Weimerskirch 1990). Southern Australia is an important wintering ground for non-breeding and juvenile birds from the Atlantic and Indian Ocean breeding colonies. Non-breeding and juvenile birds remain north of 50°S. During the non-breeding season, birds disperse more widely with females generally foraging in more northerly latitudes of the southern hemisphere and males generally foraging further south (Baker and Hamilton 2013). The entire South-east Marine Region north of 50°S is recognised as a foraging BIA for the species and overlaps the Planning Areas (Figure 6-34).

The white-capped albatross is endemic to New Zealand and is limited to five breeding sites on the Auckland Islands, and Antipodes Islands (New Zealand), with the largest population on Disappointment Island in the Auckland Islands (CoA 2022a). Australia is within the foraging range of the White-capped Albatross (Figure 18). Tracking studies indicate that dispersal from the breeding colonies is generally in the higher latitudes of the southern hemisphere including waters adjacent to south-eastern Australia, particularly north-east of Tasmania. At sea records are problematic due to similarities between and overlapping range of white-capped albatross and shy albatross (CoA 2022). The Bass Planning Area overlaps the foraging BIA for this species (Figure 6-35).

The black petrel is recognised as a conservation value in the Temperate East Marine Region (DSEWPaC 2012d). This species is endemic to New Zealand and breeds annually and exclusively on Little Barrier Island and Great Barrier Island where eggs are laid in December and chicks fledge in May (ACAP 2023). They are typically surface feeders and shallow divers foraging in groups of up to 300 and preying mainly on squid with the occasional fish, tunicates, crustaceans, and cyclostomes (ACAP 2023). Little is known about the foraging range and at-sea distribution of the black petrel; however banding data suggests that this species does forage as far as eastern Australia (ACAP 2023, Bell et al. 2009). Eastern Australia is recognised as a foraging BIA for this species and overlaps the Bass Planning Area (Figure 6-35).

Both the common diving-petrel and the white-faced storm petrel are not listed as threatened species under the EPBC Act, and have large populations within Australia, accounting for 5% and 25% respectively of the global population (DoE 2015b). The common diving-petrel breeds on islands off south-east Australia and Tasmania; there are 30 sites with significant breeding colonies (defined as more than 1,000 breeding pairs) known in Tasmania, and 12 sites in Victoria (including Seal Island, Wilson's Promontory and Lady Julia Percy Island) (DoE 2015e). There are 15 sites with significant breeding colonies in Tasmania, and three sites with Victoria, for the white-faced storm petrel (DoE 2015e). A BIA for foraging has been identified for the common diving-petrel that overlaps with the operational and planning areas. The common-diving petrel has breeding and foraging BIAs that overlap the Planning Areas (Figure 6-35). The white-faced storm petrel has foraging and breeding BIAs that overlap the Planning Areas (Figure 6-36).

Gould's petrel is recognised as a conservation value in the South-east and Temperate East Marine Region (CoA 2015a, DSEWPaC 2012d). This endangered species breeds in NSW on Cabbage Tree

Island and nearby to Boondelbah Island, close to Port Stephens, and at least one pair breeds on Montague Island near Narooma. The petrel is seldomly recorded away from its breeding islands. However, it has been recorded absent from the islands between May and late August. It's distribution while at sea is poorly known, however it has been suggested that most would occur in the Tasman sea and waters off the south-east of Australia and Tasmania between December and April (DEC NSW 2006, DoE 2024l). Breeding is known to occur within the Planning Area.

The Kermadec petrel (western) is recognised as a conservation value in the Temperate East Marine Region. This species is listed as vulnerable and breeds on Balls Pyramid and Phillip island where there is estimated to be 40 breeding birds in the Norfolk Island Group (DSEWPaC 2012d). The pelagic distribution of this species is poorly known. However, it usually occurs in subtropical and tropical waters from 20° to 30°S or south into temperate waters of the Tasman Sea to forage during non-breeding seasons (DoE 2024m). Foraging, feeding or related behaviour may occur within the Planning Area.

The soft-plumaged petrel is recognised as a conservation value in the South-east marine region (CoA 2015a). This petrel is listed as vulnerable and is usually found over temperate and subantarctic waters in the South Atlantic, southern Indian and western South Pacific Oceans. The soft-plumaged petrel is a regular visitor to Australian seas and is most numerous between 30° and 50°S. This species breed on Maatsuyker Island off southern Tasmania with six breeding pairs recorded between 2001 and 2002 (DoE 2024n). Breeding is known to occur within the Planning Area.

The Wilson's storm-petrel (*Oceanites oceanicus*) is recognised as a conservation value in the Temperate East Marine Region (DSEWPaC 2012d). This species is one of the world's most abundant seabirds and the smallest endotherm that breeds in Antarctic waters (DoE 2023). They are a gregarious species congregating when feeding and migrating and breeding colonially, however at sea they are found singularly or in a small flock. Wilson's storm-petrels undertake a trans-equatorial migration in autumn spending the non-breeding season in the northern hemisphere (DoE 2023). The autumn months are when most species observations occur in Australia along the coast of NSW, Victoria, Tasmania and South Australia. The Wilson's storm petrel has a migration BIA that overlaps the Bass Planning Area (Figure 6-36).

The great-winged petrel (*Pterodroma macroptera*) is recognised as a conservation value in the Temperate East Marine Region and has a widespread and sparse distribution (DSEWPaC 2012d). Breeding occurs between June to January in the southern hemisphere. It nests in burrows or above ground in rock crevices, among tree roots or under scrub usually below 400 m Above Sea Level and lays a single egg (CoA 2020a). Outside the breeding season it disperses widely feeding mainly at night on squid, with some fish and crustaceans most of which is obtained by dipping and surface-seizing (CoA 2022a). The great-winged petrel has a foraging BIA that overlaps the Bass Planning Area (Figure 6-35).

Within Australia, the northern giant petrel is limited to a breeding colony on Macquarie Island, and visits areas off Australia's mainland predominantly during the winter months (May-October) (DoE 2023d). It is thought to be a predominantly diurnal forager, but it feeds its chicks during both the day and at night (DoE 2023d). The northern giant petrel has a foraging BIA that overlaps the Bass Planning Area (Figure 6-35).

The southern giant petrel is marine bird that occurs in Antarctic to subtropical waters and is common in Australian waters (DoE 2023e). The southern giant petrel is an opportunist scavenger and predator. At sea, it forages largely by surface-seizing. It also scavenges on land and regularly follows ships. It apparently locates food by smell and feeds its chicks both day and night (DoE 2023e). The southern giant petrel has a foraging BIA that overlaps the Bass Planning Area (Figure 6-37).

Shearwaters

Four species of shearwater (flesh-footed shearwater (*Ardenna carneipes*), short-tailed shearwater (*Ardenna tenuirostris*), sooty shearwater (*Ardenna grisea*), wedge-tailed shearwater (*Ardenna pacifica*)) may occur within the Planning Area. All of the shearwater species listed are managed under the Wildlife Conservation Plan for Seabirds (CoA 2020a). There are a range of anthropogenic threats that affect the shearwater family which may vary based on species, stocks and life history stage. Pertinent threats relating to the activity include climate change, marine pollution, and mortality and injury arising from interactions with commercial fishing activities (CoA 2020). In addition, the short-tailed shearwater, fledglings in particular, appear to have an increased sensitivity to artificial light although fewer than 1% of fledglings produced annually are thought to be affected by mortality (CoA 2020).

The flesh-footed shearwater (*Ardenna carneipes*) has a foraging BIA that overlaps the Bass Planning Area (Figure 6-37). This species is recognised as a conservation value in the Temperate East Marine Region (DSEWPaC 2012d). They are a trans-equatorial migrant widely distributed across the south-western Pacific during breeding season (early September to early May) and is a common visitor to the waters of the continental shelf/slope and occasionally inshore waters. The species breeds in burrows on sloping ground in coastal forest, scrubland, shrubland or grassland, the majority of which lie off the coast of southern WA, with the remaining being Smith Island (SA) and Lord Howe Island (NSW). The flesh-footed shearwater feeds on small fish, cephalopod molluscs (squid, cuttlefish, nautilus and argonauts), crustaceans (barnacles and shrimp), other soft-bodied invertebrates (such as *Velella*) and offal. The species forages almost entirely at sea and very rarely on land. It obtains most of its food by surface plunging or pursuit plunging. It also regularly forages by settling on the surface of the ocean and snatching prey from the surface 'surface seizing'), momentarily submerging onto prey beneath the surface ('surface diving') or diving and pursuing prey beneath the surface by swimming ('pursuit diving'). Birds have also been observed flying low over the ocean and pattering the water with their feet while picking food items from the surface (termed 'pattering') (DoE 2023f).

The short-tailed shearwater (*Ardenna tenuirostris*) has a foraging BIA (September to May) and breeding BIAs that overlap the Planning Areas (Figure 6-37). This species is recognised as a conservation value in the South-East and Temperate East Marine Regions (CoA 2015a, DSEWPaC 2012d). The short-tailed shearwater migrates to the Northern hemisphere for the austral winter and is generally only present in Australian waters from September to May. They are common in the South-east Marine Region and largely found on numerous islands off Victoria and Tasmania during breeding (Baker and Hamilton 2013, Skira et al. 1996). During breeding they conduct a bimodal feeding strategy, alternating short foraging trips to local waters with long foraging trips (up to 17 days) to the Polar Frontal Zone. Short trips allow greater chick provisioning at the sacrifice of body condition, which is then recovered in richer subantarctic waters. Diet includes fish (particularly myctophids), crustaceans and squid (Weimerskirch and Cherel 1998). Feeding occurs in flocks of up to 20,000 birds, and it has been seen associated with cetaceans.

The short-tailed shearwater, also known as a muttonbird, is one of few Australian native birds that is harvested to this day (DNRET 2019). Mutton birding is a cultural, non-commercial, and commercial

activity allowed for in reserves (excluding Nature Reserves) and private land in Tasmania. The season runs from the 27 March to 30 April each year when chicks are taken for their feathers, flesh and oil (DNRET 2019). To this day, muttonbird harvesting is an important part of Aboriginal culture in Tasmania. Commercial sheds are located on Babel, Chappell, Big Dog and Trefoil Islands all off Tasmania's north-west coast.

The sooty shearwater (*Ardenna grisea*) is listed as vulnerable and is recognised as a conservation value in the South-East and Temperate East Marine Regions (CoA 2015a, DSEWPaC 2012d). It nests on islands and headlands in large colonies. Burrows are dug for breeding under tussock grass and low scrub. Birds typically do not return to their natal colonies until age four. They feed on fish, crustacea and cephalopods, caught while diving. Short (1–3 days) and long (5–15 days) provisioning trips are made by parents; longer trips allow foraging along the Antarctic Polar Front, reducing competition close to breeding grounds and allowing vast colonies to persist (BirdLife International 2013). The Australian breeding population is estimated to be 6,500 pairs (DCCEEW 2023l). In Australian territory, the sooty shearwater breeds on offshore islands off New South Wales and Tasmania. Breeding populations within Tasmania are known on Tasman Island, Hippolyte Rock, Maatsuyker Island and Courts Island. These and associated substantial foraging areas are recognised as BIAs for the species and overlap the Planning Areas (Figure 6-37).

The wedge-tailed shearwater (*Ardenna pacifica*) is recognised as a conservation value in the Temperate East Marine Region (DSEWPaC 2012d). They have a foraging BIA (August to May) and breeding BIA that overlaps the Planning Areas (Figure 6-37). Movement patterns of the wedge-tailed shearwater are poorly known but populations at the northern and southern extremities of the known range are migratory, departing nests in early April to early May and spending the non-breeding season in the tropics (DoE 2023g). In Australia, wedge-tailed shearwaters have been observed feeding along the junction between inshore and offshore water masses. There is no detailed analysis of the diet of Australian adult wedge-tailed shearwaters, however tropical residing wedge-tailed shearwater birds are known to mostly consume fish, some cephalopods, insects, jellyfish and prawns (DoE 2023g). Food is taken by contact-dipping, dipping, surface-seizing and, rarely, deep-plunging up to 2 m deep (DoE 2023g).

Terns

The greater crested tern (*Thalasseus bergii*) is recognised as a conservation value in the Temperate East Marine Region (DSEWPaC 2012d). This species has distinctive features; large size, shaggy crest, yellow bill and can be found on islands and coastlines of tropical and subtropical areas from South Africa to Australia (CoA 2020b). The species breeds in large colonies, in small groups or amidst colonies of other species. Nests are shallow scrape in bare sand, rock or coral in flat open sites on offshore islands, low-lying coral reefs, sandy or rocky coastal islets, coastal spits, lagoon mudflats or islets in saltpans and sewage works (Del Hoyo et al. 1996). Outside the breeding season it can be found at sea throughout its range, with the exception of the central Indian Ocean. A foraging and breeding BIA for the greater crested tern overlaps the Bass Planning Area (Figure 6-38).

The white-fronted tern (*Sterna striata*) is recognised as a conservation value in the South-east Marine Region (CoA 2015a). They are a medium sized 'commic' tern endemic to Australasia breeding in New Zealand and on Flinders and Cape Barren Island off the north-east coast of Tasmania (CoA 2020b). It is also a winter visitor to Australia, from south Queensland to Tasmania and west to South Australia. This species can be found in coastal areas, nesting on rocky or sandy beaches and shingle islands in rivers, also on coastal cliffs and deserted barges, often close to the surf (CoA 2020b). The white-fronted tern

often feeds in flocks and in winter it feeds over oceanic waters and feeds almost exclusively on fish, but will also take shrimp, feeding in the surf zone or several km out to sea (CoA 2020b). A foraging and breeding BIA for the white-fronted tern overlaps the Bass Planning Area (Figure 6-38).

The Australian fairy tern is recognised as a conservation value in the South-east Marine Region (CoA 2015a). This species is listed as vulnerable and occurs along the coasts of NSW, Victoria, Tasmania, South Australia, and Western Australia. These terns are found in a variety of habitats including offshore, estuarine, wetlands, beaches, and lakes. The subspecies migrate within Tasmania and southern Western Australia where they are observed less frequently in winter months. They are more sedentary in the north of Western Australia, South Australia, and Victoria (DSEWPaC 2011d). Foraging, feeding or related behaviours are likely to occur within the Operational Area.

The Caspian tern is recognised as a conservation value in the South-east Marine Region (CoA 2015a). This tern species is listed as marine and migratory. This species usually forages in open wetlands, lakes and rivers preferring shallow water but are also found in open coastal waters. It is the largest tern in Australia and has widespread breeding habitats located across all states in Australia in a range of different habitats including low islands, cays, banks, ridges, beaches, terrestrial wetlands, and rocky islets. Breeding habitats have been recorded in Corner Inlet, Mud Island in Port Phillip Bay and Mallacoota in Victoria, and on the Furneaux Group across the Tasmanian coastline (DoE 2024o). Breeding is known to occur within the Planning Area.

The fairy tern is a marine listed species. There is no approved conservation or listing advice for the fairy tern. Population estimates in 2011 indicate that there are a few hundred pairs of fairy terns breeding in South Australia and Tasmania with 120 to 150 in Victoria and up 70 individuals in NSW. The fairy tern breeds on sheltered mainland coastlines and close islands on sandy beaches above high tide but below where vegetation occurs. Breeding typically occurs from mid to late October through to February (BirdLife International 2024c). Breeding is known to occur within the Planning Area.

The little tern is recognised as a conservation value in the Temperate East Marine Region (DSEWPaC 2012d). The little tern is recognised as conservation dependant under the EPBC Act (TSSC 2002). This small tern is listed as marine and migratory under the EPBC Act, there is no approved conservation advice for this species. The Australian population is divided into two major subpopulations, the northern subpopulation which breeds along coastlines in the northern areas of Australia and an eastern subpopulation which breeds on the eastern and south-eastern coast of Tasmania and extending to western Victoria and South Australia. Breeding occurs during austral spring-summer. Non-breeding pairs extend further around the Australian coastline (DoE 2024p). Breeding is known to occur within the Planning Area.

Australasian Gannet

The Australasian gannet generally feeds over the continental shelf or inshore waters. Their diet is comprised mainly of pelagic fish, but also squid and garfish. Prey is caught mainly by plunge-diving, but it is also seen regularly attending trawlers. Breeding is highly seasonal (October–May), nesting on the ground in small but dense colonies (CoA 2015a). Important breeding locations for the Australasian gannet within the Planning Area include Pedra Branca, Eddystone Rocks, Sidmouth Rocks, and Black Pyramid (Tasmania) and Lawrence Rocks (Victoria). BIAs for foraging and aggregation occur within the Planning Areas with substantial foraging sites within Port Philip Bay and Pedra Branca (Figure 6-38).

Black-face Cormorant

The black-faced cormorant is recognised as a conservation value in the South-east Marine Region (CoA 2015a). They are a large seabird that is endemic to southern Australia and is mostly found along the coasts of Tasmania and Victoria (CoA 2020b). Breeding normally occurs on rocky islands, but also on stacks, slopes and sea cliffs in colonies of up to 2,500 individuals (del Hoyo et al. 1992). It feeds in coastal waters, sometimes in sheltered places in bays and islets and can even be found entering rivers along the coast (CoA 2020b). A foraging and breeding BIA for the black-faced cormorant overlaps the Planning Areas (Figure 6-38).

Cape Gannet

The cape gannet is a listed marine species. This species typically breeds in South Africa. However, several birds have occasionally been found to breed on offshore Australian islands, together with Australasian gannets, although the Cape species is never represented by more than a few pairs (Pizzey 2007). The PMST Report identified that breeding is known to occur within the Planning Area, but no records could be found as to where specifically.

Little Penguin

The little penguin is recognised as a conservation value in the South-east and Temperate East Marine Region (CoA 2015a, DSEWPaC 2012d). It is the smallest species of penguin in the world and are permanent residents on a number of inshore and offshore islands. The Australian population is large but not thought to exceed one million birds (CoA 2015a). Bass Strait has the largest proportion (approximately 60%) of the known breeding colonies in Australia; however, breeding populations are also found on the New South Wales coast. Individuals exhibit strong site fidelity, returning to the same breeding colony each year to breed in the winter and spring months (Gillanders et al. 2013). The diet of a little penguin includes small school fish, squid and krill. Prey is typically caught with rapid jabs of the beak and swallowed whole. Little penguins are also an important component of the Australian and New Zealand fur-seals' diet (Parliament of South Australia 2011).

BIAs for breeding and foraging have been identified for the little penguin within the Planning Areas (Figure 6-39).

Orange-bellied Parrot

The orange-bellied parrot (*Neophema chrysogaster*) (listed as critically endangered under the EPBC Act) breeds in Tasmania during summer, migrates north across Bass Strait in autumn and spends winters on the mainland. The migration route includes the west coast of Tasmania and King Island (Figure 6-40). Birds depart the mainland for Tasmania from September to November (Green 1969). The southward migration is rapid (Stephenson 1991), so there are few migration records. The northward migration across western Bass Strait is more prolonged (Higgins & Davies 1996). The orange-bellied parrot is protected under the National Recovery Plan for the Orange-bellied Parrot (DELWP 2016). The parrot's breeding habitat is restricted to south-west Tasmania, where breeding occurs from November to mid-January mainly within 30 km of the coast. The species forage on the ground or in low vegetation (Loyn et al. 1986). During winter, on mainland Australia, orange-bellied parrots are found mostly within 3 km of the coast. In Victoria, they mostly occur in sheltered coastal habitats, such as bays, lagoons, and estuaries. They are also found in low samphire herbland dominated by beaded glasswort (*Sarcocornia quinqueflora*), sea heath (Frankenia pauciflora) or sea-blite (*Suaeda australis*), and in taller shrubland dominated by shrubby glasswort (*Sclerostegia arbuscula*) (DoE 2023r). There are also non-breeding orange-bellied parrots on mainland Australia, between Goolwa in Australia and Corner Inlet in Victoria.

The 2022-23 breeding season showed a record number of 74 orange-bellied parrots return to breeding grounds and production of 59 fledglings, the third highest fledgling production since 2004 (SWIFFT 2023). As of November 2023, 79 individuals had return to breeding grounds the largest number of returns in over 15 years (DNRET 2023).

The orange-bellied parrot is listed as one of the attributes that contribute to the Tasmanian Wilderness World Heritage Area's Outstanding Universal Value (DCCEEW 2021a).

The Planning Areas and Bass Operational Area overlap the orange-bellied parrot distribution and migration route (Figure 6-40). However, parrots rarely land or forage out at sea and Beach has not recorded the presence of any orange-bellied parrot at any of their offshore facilities or vessels over the past 15 years.

Black Currawong (King Island)
The black currawong (King Island) is listed as vulnerable and is endemic to King Island, Tasmania. This bird was located sporadically in all parts of the island, but has a declining population due to clearing of scrubland for agriculture. This species lives in wet sclerophyll forest, woodlands and heath and nests in trees (TSSC 2015h). The PMST Report identified breeding is likely to occur within the Planning Area however this is unlikely as it nests in trees which are inshore from coastal areas.

Grey-tailed Tattler
The grey-tailed tattler has a wide global and Australian distribution and is typically distributed in northern coastal areas. In NSW the grey-tailed tattler can be found along the coastline from the Queensland border southwards to Tilba Lake. This bird is rarely recorded in Victoria, however sightings have been recorded in Gippsland and east of McLaughlans Beach. The largest population of this bird is located in Corner Inlet, westwards of Wetsernport and Port Phillip bay. Occasional sightings have been recorded along the coast near Killarney, Port Fairy, Discovery Bay, and Sperm Whale Head. The grey-tailed tattler is migratory and arrives in Australia mostly in August and can remain on breeding grounds until September and October. Roosting typically occurs in the branches of mangroves and dense shrubs. If mangroves are not present, roosting can occur on rocks that can be partially submerged, and on rare occasions, sand dunes (DoE 2024q). The PMST Report identified roosting is known to occur within the Planning Area.

Kelp Gull
The kelp gull has a wide global distribution. It breeds on coasts and islands throughout the southern hemisphere and is found on subantarctic islands on the Antarctic peninsula, and on the southern coastline of Australia and all of New Zealand. This species is typically sedentary, however some southern populations migrate north during non-breeding seasons. They breed in rocky outcrops, reefs, offshore islands, estuaries, mudflats, sandbanks, and on rocky and beaches above the high tide mark between late September to January in large colonies of several hundred pairs. Habitat includes sheltered coastal harbours, bays, inlets, estuaries, beaches and rocky shores. They usually forage within 10 km of the shoreline in coastal habitats (BirdLife 2024d). The PMST Report identified breeding is known to occur within the Planning Area.

Masked Owl (Tasmanian)
The masked owl (Tasmania) is listed as vulnerable and endemic to Tasmania and several near shore islands. However, it is not found on the King Island and Furneaux Island Group. The highest densities of this bird are located in the east and northern areas of Tasmania. This species inhabits a diverse

range of forests and woodlands nests in large tree hollows during mid-October to November. (TSSC 2010). The PMST Report identified breeding is known to occur within the Planning Area, however this is unlikely as it is associated with forests and woodlands which are inshore from coastal areas.

Pacific Gull

The pacific gull is recognised as a conservation value in the South-east Marine Region (CoA 2015a). This gull is the largest gull in Australia and endemic to the region. The subspecies *pacificus* breeds in Tasmania, and on many Bass Strait islands and westward along the Victorian coast ranging from Wilson's Promontory to the South Australian border. Breeding occurs between September and January (CoA 2020a). The PMST Report identified breeding is known to occur within the Planning Area.

Regent Honeyeater

The regent honeyeater is listed as a critically endangered species and is distributed between the south-east of Queensland and central Victoria. This bird occurs primarily in box-ironbark woodlands but is also found in other forest types. It usually feeds on nectar from eucalyptus and mistletoe and prefers larger trees for foraging but its diet can also include insects and fruit (DoE 2015g). The PMST Report identified foraging, feeding or related behaviour is likely to occur within the Planning Area, however this is unlikely as foraging occurs within woodlands and forests which are inshore from coastal areas.

Satin Flycatcher

The satin flycatcher is widely distributed across eastern Australia and will also migrate to New Zealand. In Victoria, the species is found along the south and the east, in the area south of a line joining Numurkah, Maldon, the northern Grampians, Balmoral and Nelson. In Tasmania, they are widespread along the east and regularly occur on islands in the Bass Strait including Albatross Island, King Island, and the Furneaux Group. They usually inhabit eucalypt forests and prefer to nest in the outer branches of trees such as paperbarks, eucalypts, and banksias (DoE 2024r). The PMST Report identified breeding is known to occur within the Planning Area, however this is unlikely as it is associated with forests which are inshore from coastal areas.

Swift Parrot

The swift parrot is listed as critically endangered and a marine fly over species. The swift parrot breeds in Tasmania during summer months before migrating northwards to mainland Australia during winter. They are found in a range of habitats. The breeding areas of this parrot are found in the east and south-east coast of Tasmania which closely mirrors the distribution of the blue gum (*Eucalyptus globulus*) and in the north-west of the state between Launceston and Smithton. When on the mainland Victoria, the parrots are usually found in dry forests and woodlands of the box-ironbark region in the Great Dividing Range (TSSC 2016d). The PMST Report identified breeding is known to occur within the Planning Area, however this is unlikely as it is associated with forests which are inshore from coastal areas.

Tasmanian Azure Kingfisher

The Tasmanian azure kingfisher is an endangered species which is endemic to Tasmania. This bird occurs along river systems and in eucalypt forests in the south, west and north-west coast with occasional sightings in the north-east, east, centre and Bass Strait Islands. Irregular sightings have been recorded on King Island, Flinders Islands and Bass Pyramid. The Tasmanian azure kingfisher builds burrow nests near the tops of streams and riverbanks with a tunnel that extends 20 to 40 cm into a widened chamber. This bird typically forages in freshwater bodies and occasionally on the ground (DoE 2024s). The PMST Report identified breeding is known to occur within the Planning Area,

however this is unlikely as it is associated with river systems and forests which are inshore from coastal areas.

Tasmanian Wedge-tailed Eagle

The Tasmanian wedge-tailed eagle is an endangered species that is found only in Tasmania and surrounding islands. It is widely distributed on mainland Tasmania along both coastal and inland regions. It is also found on Flinders Island, Three Hummock Island, Schouten Island, Maria Island and Bruny Island. Breeding occurs throughout these areas. These birds typically reside in temperate rainforests, dry woodlands, coastal heathland, wetlands. It nests in a range of old-growth native forests which are usually dominated by eucalyptus. The total population of these species was estimated to be less than 1,000 birds in 1997 (DoE 2024t). The PMST Report identified breeding is likely to occur within the Planning Area, however, this is more likely to occur within forest area inshore from coastal areas.

Shorebirds

45 shorebirds were identified as breeding or roosting within the Planning Area. These species are commonly found on coastal shores including beaches and rocky shores and either feed at low tide on worms, crustaceans and molluscs or fish species or feed on aquatic biota. Many of the wader species are migratory travelling from the Northern Hemisphere in non-breeding months (Higgins & Davies 1996). Travelling across the East Asian-Australasian Flyway, migratory shorebirds travel thousands of kilometres each year during their annual return journeys between their breeding grounds in the northern hemisphere and their non-breeding grounds in the southern hemisphere (DoE 2015b). Most shorebirds inhabit intertidal mudflats, rocky islets, sand beaches, mangroves, rocky coastline and coral reefs. Roosting occurs in similar habitats and species are found feeding on fish, crustaceans, aquatic insects, as well as plants and seeds (Higgins & Davies 1996).

The Great knot is listed as a vulnerable marine and migratory species. It is recorded around the entirety of the Australian coastline with the greatest numbers occurring in northern Australia. This species breeds in north-east Siberia. The numbers of birds present in Victoria has had a marked decline from 810 to 167 birds which may reflect the population that is arriving in Australia rather than the changes in habitat. Their habitat includes sheltered coastal habitats, mudflats, estuaries and lagoons. This bird arrives in large numbers in late August to early September until March and April (DoE 2024u). Roosting is known to occur within the Planning Area.

The Grey plover is a vulnerable species which has been recorded in all Australian coastlines. It is abundant along the western and southern coast. Most records of this bird in Victoria are from Jack Smith Lake, Corner Inlet, Westernport, Port Phillip Bays, and along the western coast between Warrnambool and the South Australian border. Records in Tasmania are from the northern and eastern coasts. This species breeds in the northern hemisphere before migrating southwards during the non-breeding season (DCCEEW 2024b). Roosting is known to occur within the Planning Area.

The Ruddy turnstone is listed as a vulnerable species. It is widespread through Australia during its non-breeding season and is mostly found in coastal areas and occasionally inland. This bird prefers rock shores or beaches where there are large deposits of decomposing seaweed. This species breeds on the coasts of Europe, Asia, and North America (DCCEEW 2024i). Roosting is known to occur within the Planning Area.

The Terek sandpiper is primarily found along Australian coastlines during its non-breeding season. In Victoria this species has been recorded from Corner Inlet, Anderson Inlet, Westernport Bay, and west

Port Phillip Bay. The terek sandpiper regularly seen in Tasmania. This bird prefers to roost in mangroves and perch in branches that are 2 m off the ground. They occasionally roost in dead trees or among driftwood. In Westernport Bay, Victoria, they prefer to roost in isolated banks of mangroves surrounded by water (DCCEEW 2024). Roosting is known to occur within the Planning Area.

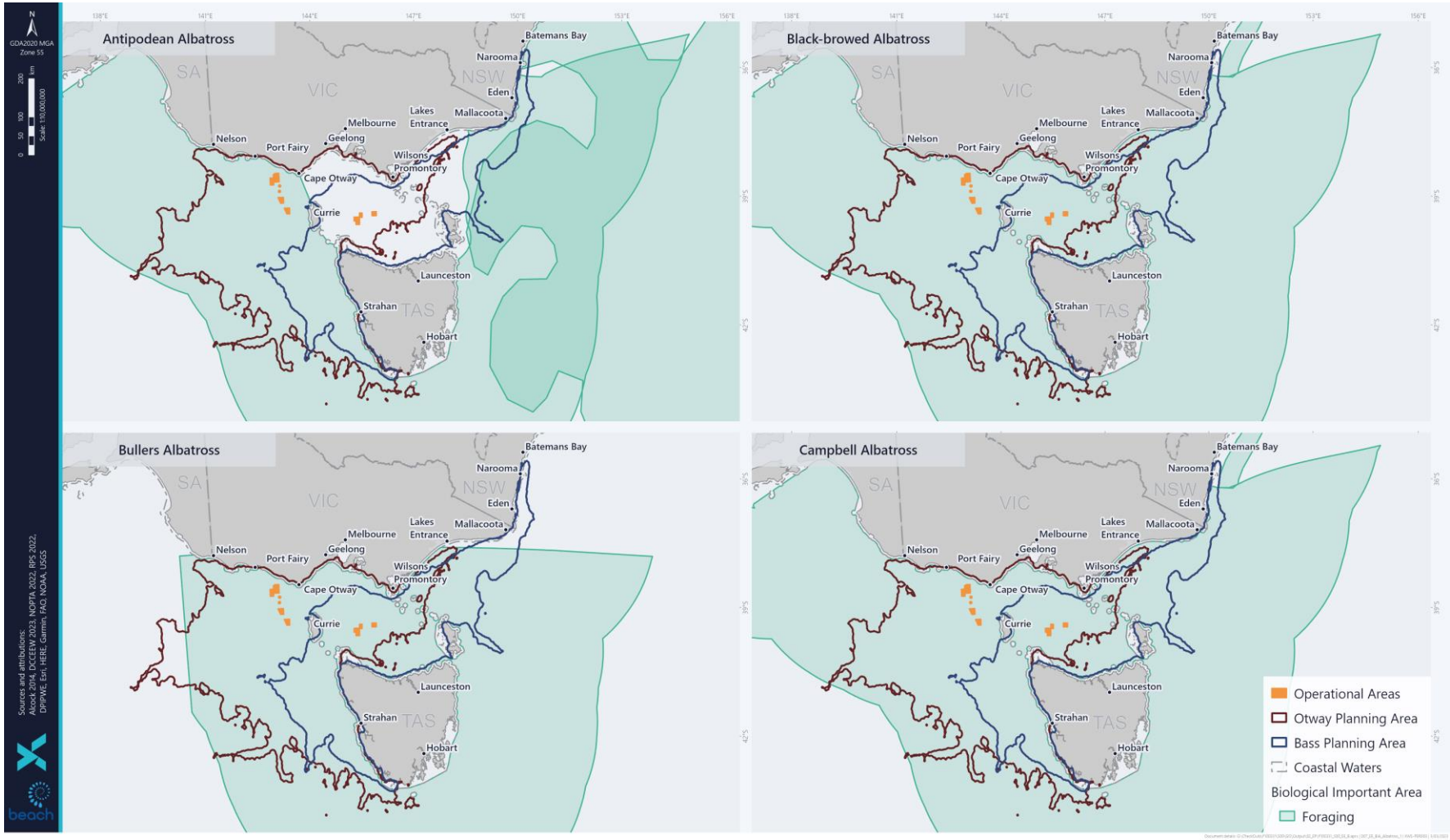


Figure 6-33: BIAs for Antipodean Albatross, Black-browed Albatross, Buller's Albatross and Campbell Albatross within the Operational and Planning Areas

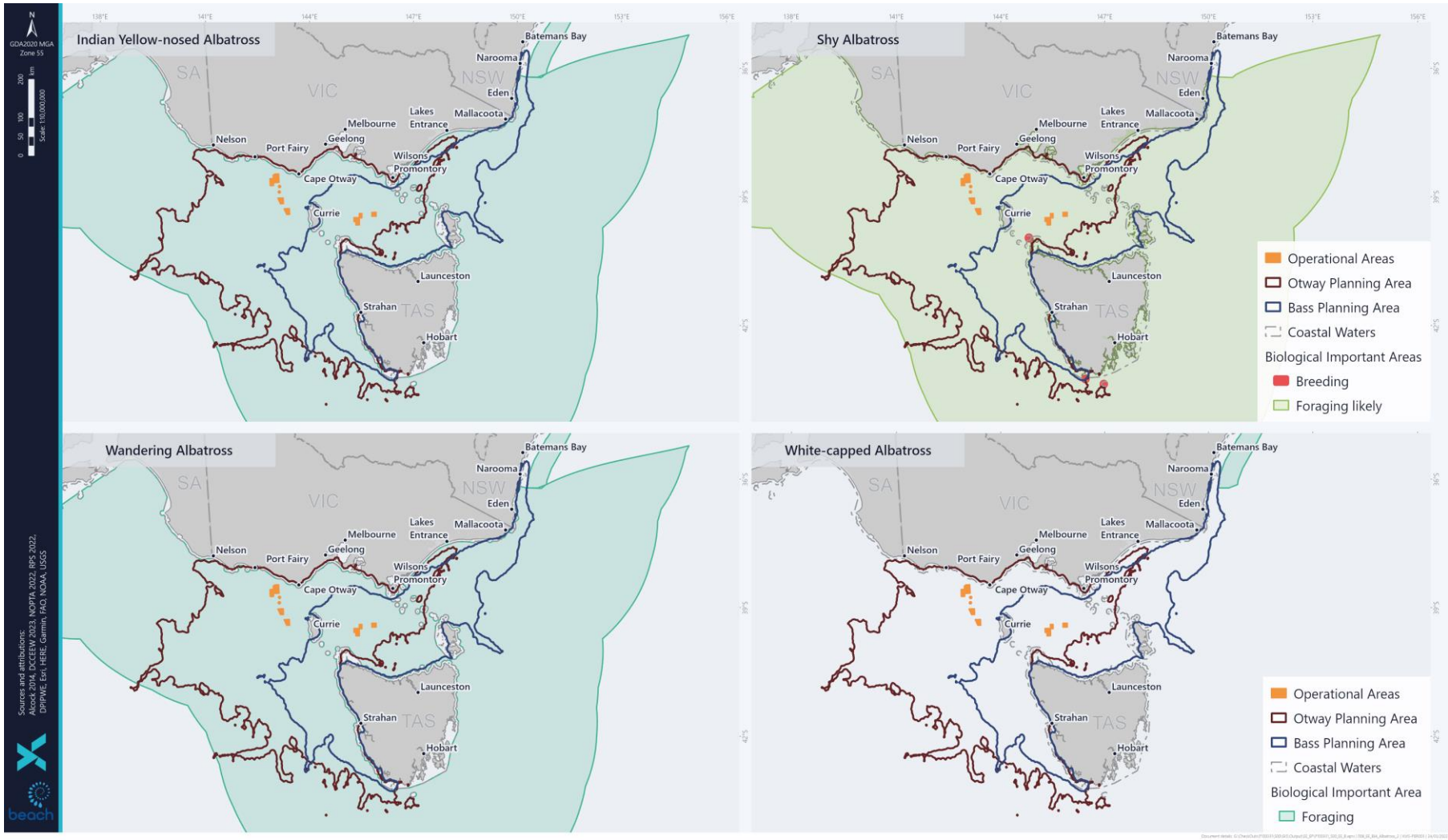


Figure 6-34: BIAs for the Indian Yellow-nosed Albatross, Shy Albatross, Wandering Albatross and White-capped Albatross within the Operational and Planning Areas

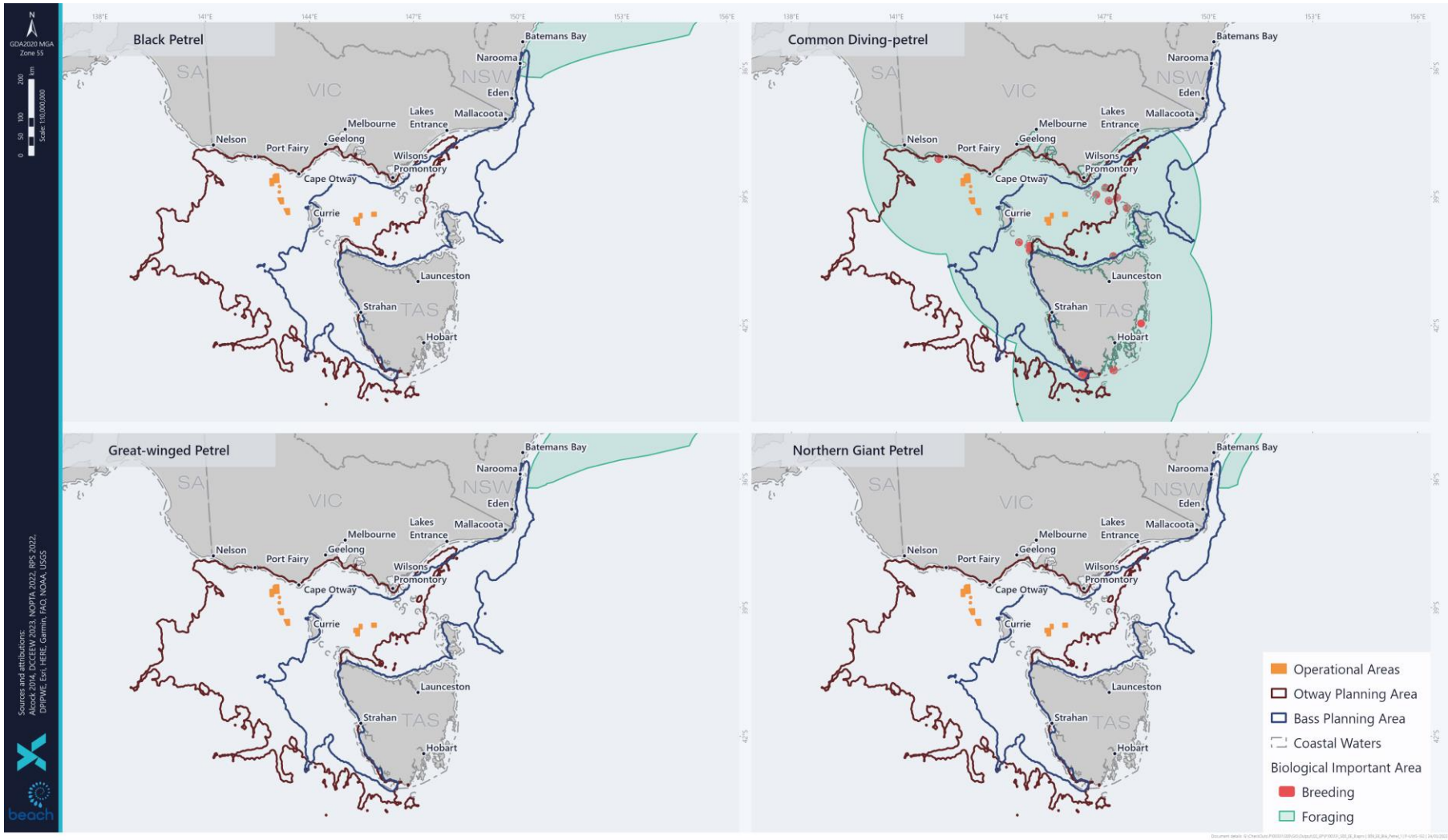


Figure 6-35: BIAs for the Black Petrel, Common Diving-petrel, Great-winged Petrel and Northern Giant Petrel within the Operational and Planning Areas

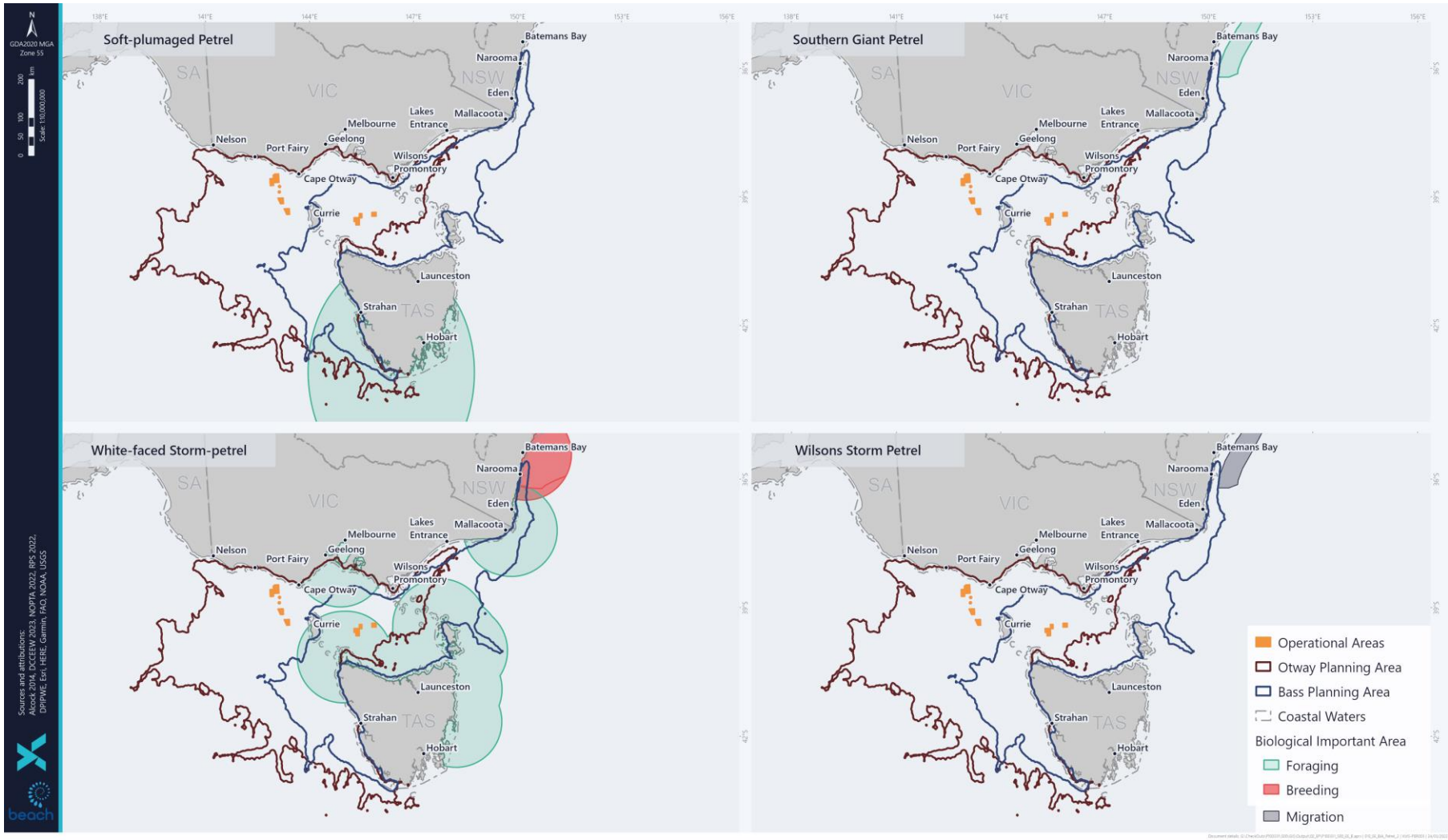


Figure 6-36: BIAs for the Soft-plumaged Petrel, Southern Giant Petrel, White-faced Storm-petrel and Wilson's Storm Petrel within the Operational and Planning Areas

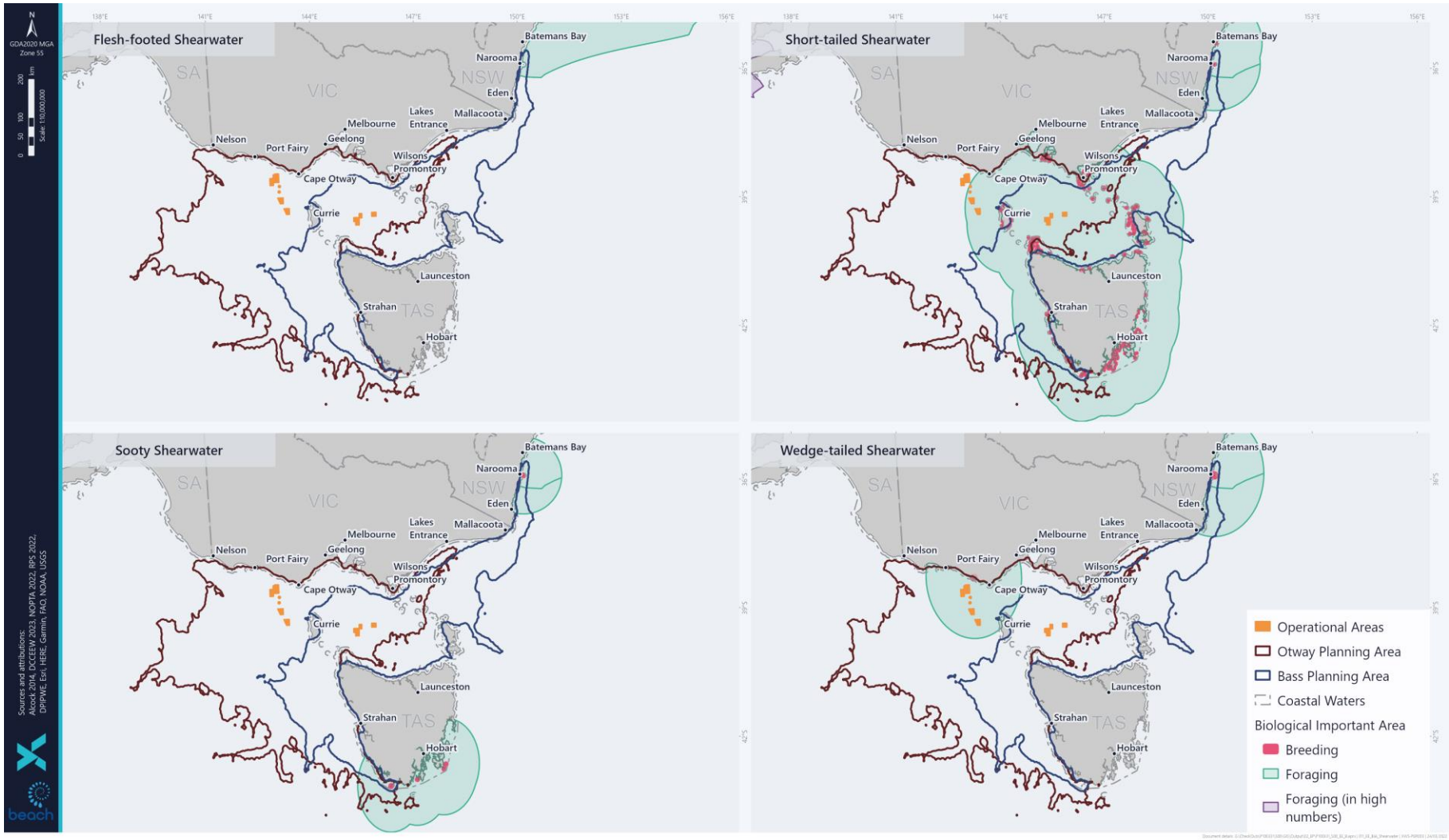


Figure 6-37: BIAs for Flesh-footed Shearwater, Short-tailed Shearwater, Sooty Shearwater and Wedge-tailed Shearwater within the Operational and Planning Areas

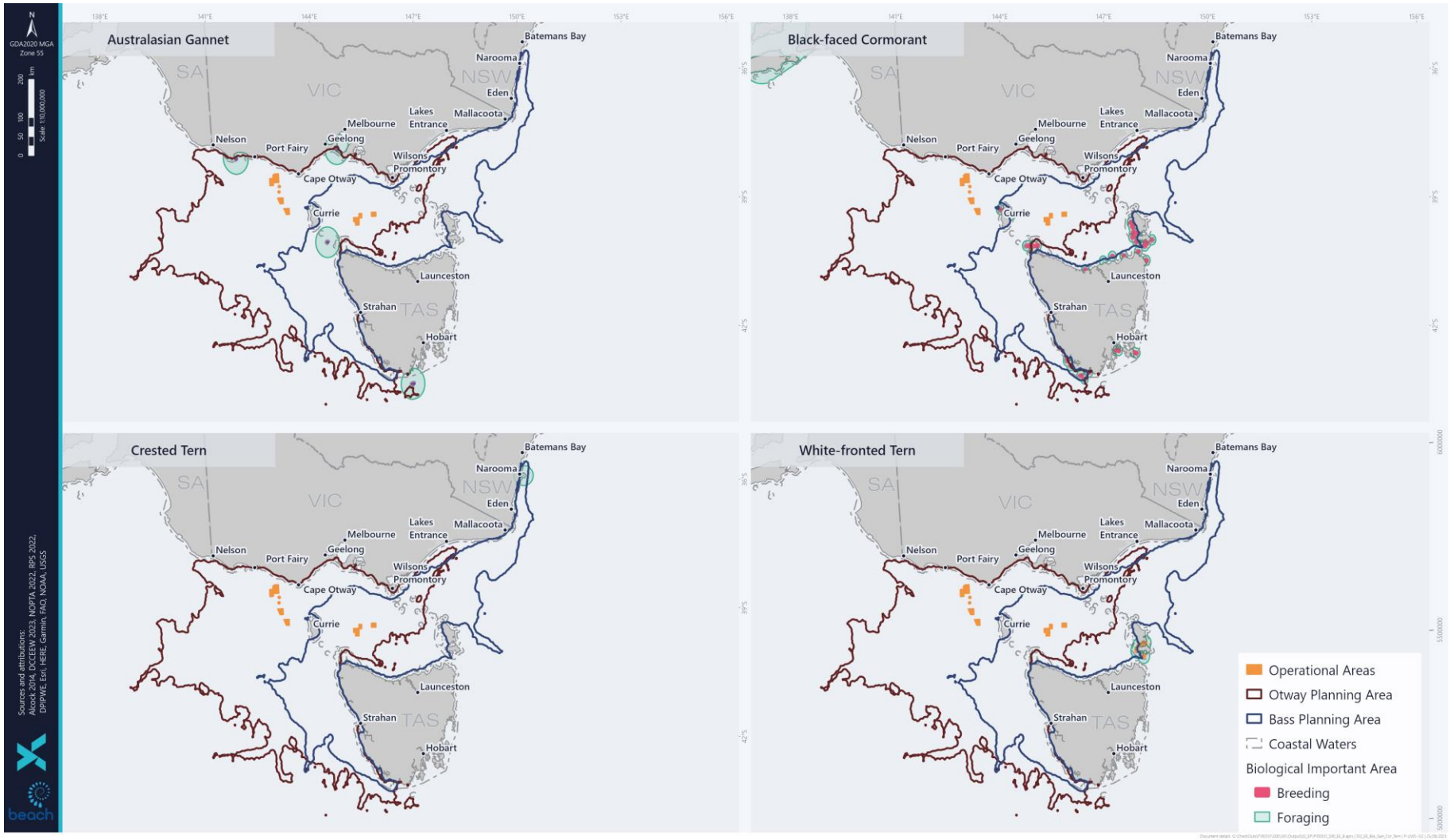


Figure 6-38: BIAs for Australasian Gannet, Black-faced Cormorant, Crested Tern and White-fronted Tern within the Operational and Planning Areas

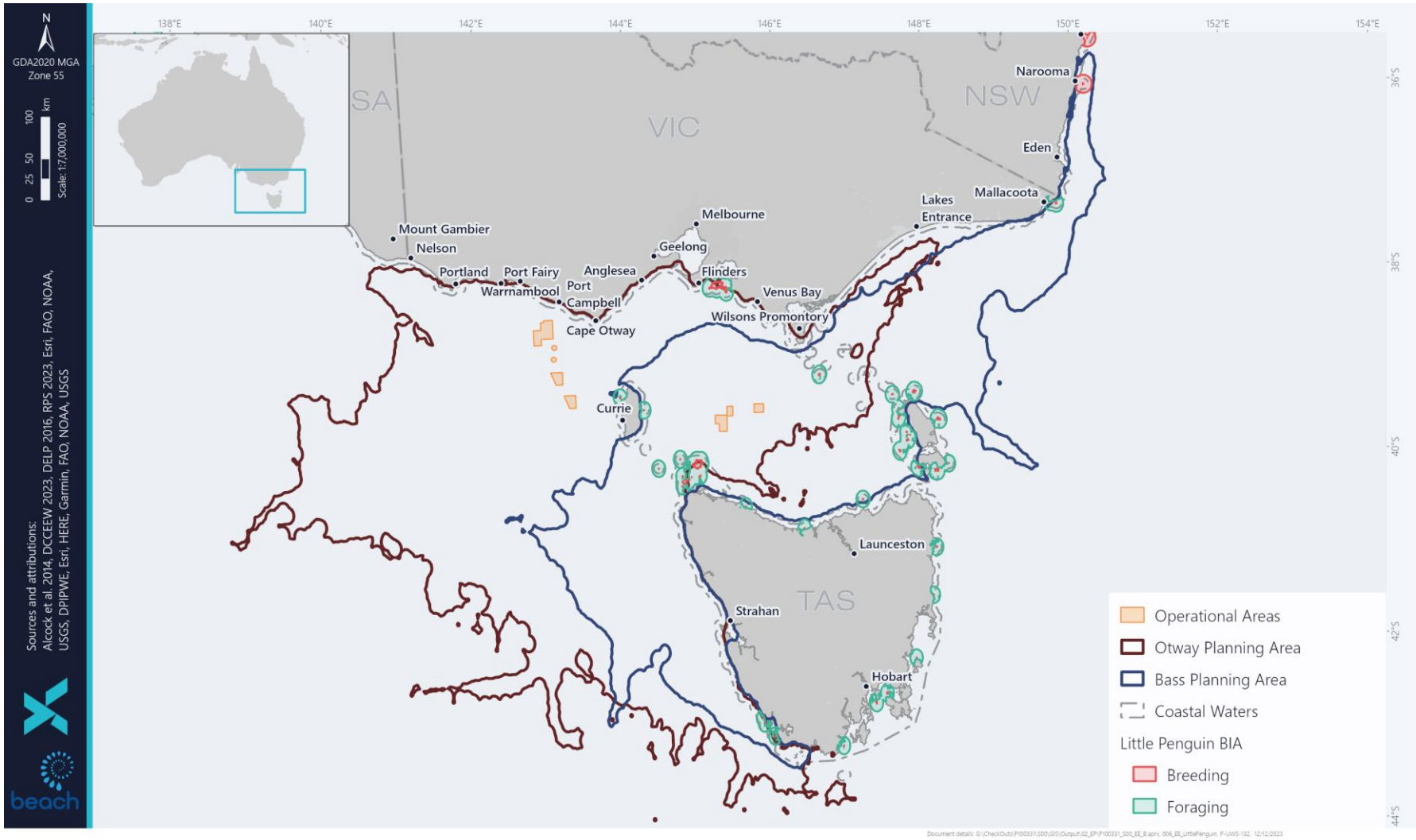


Figure 6-39: BIAs for Little Penguin within the Planning Areas

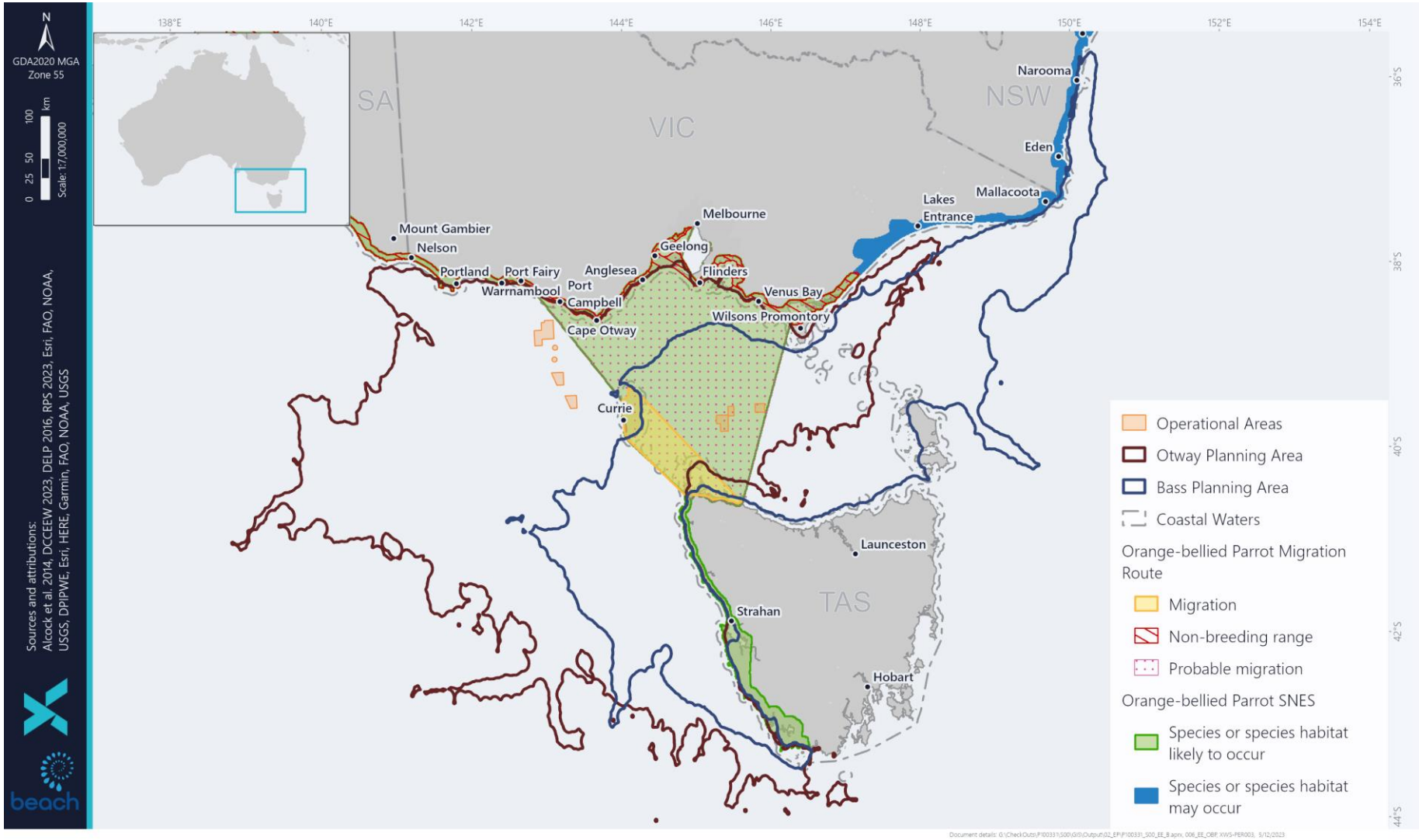


Figure 6-40: Distribution of the Orange-bellied Parrot within the Operational and Planning Areas

6.4.7.5 Marine Reptiles

The PMST Report for the Planning Areas identified five marine turtle species known to occur (Table 6-20, Appendix E). All five species of marine turtles are protected by the Recovery Plan for Marine Turtles in Australia (CoA 2017b). There are no identified BIAs for marine reptiles in the Planning Areas.

The Recovery Plan for Marine Turtles in Australia (CoA 2017b) details that the long-term recovery plan objective for marine turtles is to minimise anthropogenic threats to allow for the conservation status of marine turtles. Threats identified relevant to the activity are:

- Chemical and terrestrial discharge
- Marine debris
- Light pollution
- Habitat modification
- Vessel strike
- Noise interference
- Vessel disturbance

Table 6-20: Listed Turtle Species identified in the Planning Area

Common Name	Scientific Name	EPBC Status			Operational Area		Planning Area	
		Listed Threatened	Listed Migratory	Listed Marine	Bass	Otway	Bass	Otway
Flatback Turtle	*Natator depressus*	Vulnerable	Migratory	Listed	-	-	Species or species habitat known to occur within area	-
Green Turtle	*Chelonia mydas*	Vulnerable	Migratory	Listed	Species or species habitat may occur within area	Species or species habitat may occur within area	Foraging, feeding or related behaviour known to occur within area	Species or species habitat may occur within area
Hawksbill Turtle	*Eretmochelys imbricata*	Vulnerable	Migratory	Listed	-	-	Foraging, feeding or related behaviour known to occur within area	-
Leatherback Turtle, Leathery Turtle	*Dermochelys coriacea*	Endangered	Migratory	Listed	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area
		Approved Conservation Advice for *Dermochelys coriacea* (leatherback turtle) (DEWHA 2008).						
Loggerhead Turtle	*Caretta caretta*	Endangered	Migratory	Listed	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat known to occur within area	Foraging, feeding or related behaviour known to occur within area

Flatback Turtle
The flatback turtle (*Natator depressus*) in Australia is found only in the tropical waters of northern Australia, where it feeds on soft-bodied prey. Nesting occurs only in these tropical waters. The CoA (2020) maps the flatback turtle as having a known or likely range north of the Victorian/NSW border.

Green turtle
Green turtles (*Chelonia mydas*) nest, forage and migrate across tropical northern Australia. They usually occur between the 20°C isotherms, although individuals can stray into temperate waters as vagrant visitors (Limpus 2008; CoA 2017b). Green turtles spend their first 5-10 years drifting on ocean currents. During this pelagic (ocean-going) phase, they are often found in association with drift lines and floating rafts of sargassum. Green turtles are predominantly found in Australian waters off the Northern Territory, Queensland, and Western Australian coastlines, with limited numbers in NSW, Victoria and South Australia. There are no known nesting or foraging grounds for green turtles offshore Victoria; they occur only as rare vagrants in these waters (CoA 2017b), therefore it is expected they would only be occasional visitors in the Planning Areas.

Hawksbill Turtle
The hawksbill turtle (*Eretmochelys imbricata*) is widely distributed in the tropical and subtropical waters of Australia. Their eggs are laid on warm beaches with the most important nesting sites for the species located in northern Queensland, north-east Arnhem Land and WA (CoA 2017b). Adult hawksbill turtles are primarily found in tropical reefs where they are usually seen resting in caves and ledges or otherwise feeding on sea sponge, soft corals or other soft-bodied invertebrates.

No major nesting sites have been recorded in Victoria or Tasmania, however the CoA (2017b) maps the hawksbill turtle as having a known or likely range in eastern Bass Strait.

Leatherback turtle
The leatherback turtle (Dermochelys coriacea) is widely distributed throughout tropical, sub-tropical and temperate waters of Australia (CoA 2017b), including in oceanic waters and continental shelf waters along the coast of southern Australia (Limpus 2009). More so than other marine turtle species, the leatherback turtle utilises cold water foraging areas, with the species most commonly reported foraging along the coastal waters of central eastern Australia (southern Queensland to central NSW), south-east Australia (Tasmania, Victoria, and eastern SA), and southwestern WA (Limpus 2009). Leatherback turtles are more commonly found foraging in Australian waters along the east coast and in Bass Strait. The southern waters of Australia are one of five identified foraging sites (where area restricted behaviour occurs) for leatherback turtles (CoA 2017b).

Leatherbacks feed on soft-bodied invertebrates, including jellyfish (Limpus 2009). No major nesting has been recorded in Victoria or Tasmania, with isolated nesting recorded in the Northern Territory, Queensland, and northern NSW (CoA 2017b). The CoA (2020) maps the leatherback turtles as having a known or likely range within Bass Strait. The waters of the Planning Areas do not represent critical habitat for the species, though it is possible it may occur in low numbers during upwelling.

Loggerhead turtle
The loggerhead turtle (Caretta caretta) (EPBC Act: Endangered, Marine, Migratory) is globally distributed in sub-tropical waters (Limpus 2008), including those of eastern, northern, and western Australia (CoA 2017b), and are rarely sighted off the Victorian coast. The main Australian breeding areas for loggerhead turtles are generally confined to southern Queensland and WA (Cogger et al.

1993). Loggerhead turtles will migrate over distances in excess of 1,000 km but show a strong fidelity to their feeding and breeding areas (Limpus 2008).

Loggerhead turtles are carnivorous and feed predominantly on benthic invertebrates up to 55 m offshore. Loggerhead turtles forage in all coastal states and the Northern Territory, but are uncommon in South Australia, Victoria, and Tasmania (Commonwealth of Australia 2017b). Due to waters depths, it is unlikely loggerhead turtles would be present in most of the Planning Areas, but areas which overlap nearshore waters may provide suitable habitat along the coast.

6.4.7.6 Cetaceans

The PMST Reports identify several cetaceans that potentially occur in the Operational and Planning Areas (Appendix E). Table 6-21 details cetaceans identified in the PMST Reports. Threatened or migratory species that are likely or known to occur in the area or have an intercepting BIA within the Planning Areas are discussed in more detail in the following sections.

The Bass Strait and the Otway Basin is considered an important migratory path for humpback, blue, southern right, and to some extent the fin and sei whales. The whales use the Otway region to migrate to and from the north-eastern Australian coast and the sub-Antarctic. Of environmental importance in the Otway is the Bonney coast upwelling, the eastward flow of cool nutrient rich water across the continental shelf of the southern coast of Australia that promotes blooms of krill and attracts baleen whales during the summer months.

First nation's people around Australia have long had a strong connection to whales, which has significance as totemic ancestors to some groups. See Section 6.6.3 for further information.

Otway Whale Surveys

Gill et al. (2015) summarised cetacean sightings from 123 systematic aerial surveys undertaken over western Bass Strait and the eastern Great Australian Bight between 2002 and 2013. This paper does not include sighting data for blue whales, which has previously been reported in Gill et al. (2011) (See below section on blue whales).

These surveys recorded 133 sightings of 15 identified cetacean species consisting of seven mysticete (baleen) whale species, eight odontocete (toothed) species and 384 sightings of dolphins (Table 6-22 and Table 6-23). Survey effort was biased toward coverage of upwelling seasons, corresponding with pygmy blue whales' seasonal occurrence (November to April; 103 of 123 surveys), and relatively little survey effort occurred during 2008–2011. Cetacean species sighted within the region are described in the following sections.

Gill et al. (2015) encountered southern right and humpback whales most often from May to September, despite low survey effort in those months. Southern right whales were not recorded between October and May. Fin, Sei, and Pilot whales were sighted only from November to May (upwelling season), although this may be an artefact of their relative scarcity overall and low survey effort at other times of year. Dolphins were sighted most consistently across years. The authors caution that few conclusions about temporal occurrence can be drawn because of unequal effort distribution across seasons and the rarity of most species.

Species of cetacean sighted in the period 31 October to 19 December 2010 during the Speculant 3D Transitions Zone Seismic Survey (3DTZSS) undertaken by Origin Energy, recorded species of common dolphin (*Delphinus spp*.), bottlenose dolphin (*Tursiops spp*.), unidentified small cetaceans and fur-seals.

Origin Energy conducted a survey for cetaceans focused on Origin operations and permit in the Otway basin from June 2012 through to March of 2013. Table 6-23 lists the species present in the area Origin surveyed.

As part of Beach's Otway Drilling Campaign, marine fauna observations occurred through most of 2021 (2 February to 31 December 2021) from the drill rig and support vessels at the Artisan-1, Geographe-4, Geographe-5, Thylacine North-1 and West-1 drilling locations. Table 6-25 provides this cetacean sighting data. For whales, the highest number of detections was for blue whales (198), while for dolphins, it was the common dolphin (519). Further detail on marine fauna observations of blue whales through to 30 April 2022 is provided in the section on blue whales).

Table 6-21: Listed Cetacean Species identified in the Planning Area

Common Name	Scientific Name	EPBC Status			Operational Area		Planning Area	
		Listed Threatened	Listed Migratory	Listed Cetacean	Bass	Otway	Bass	Otway
Whales								
Andrew's Beaked Whale	*Mesoplodon bowdoini*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Antarctic Minke Whale, Dark-shoulder Minke Whale	*Balaenoptera bonaerensis*	-	Migratory	Listed	-	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
Arnoux's Beaked Whale	*Berardius arnuxii*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Blainville's Beaked Whale, Dense-beaked Whale	*Mesoplodon densirostris*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Blue Whale	*Balaenoptera musculus*	Endangered	Migratory	Listed	Species or species habitat likely to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area	Foraging, feeding or related behaviour known to occur within area
		Conservation Management Plan for the Blue Whale (CoA 2015).						
Bryde's Whale	*Balaenoptera edeni*	-	Migratory	Listed	-	-	Species or species habitat may occur within area	Species or species habitat may occur within area
Cuvier's Beaked Whale, Goose-beaked Whale	*Ziphius cavirostris*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Dwarf Sperm Whale	*Kogia sima*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
False Killer Whale	*Pseudorca crassidens*	-	-	Listed	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
Fin Whale	*Balaenoptera physalus*	Vulnerable	Migratory	Listed	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour known to occur within area
		Approved Conservation Advice for *Balaenoptera physalus* (fin whale) (TSSC 2015f).						
Gingko-toothed Beaked Whale, Gingko-toothed Whale, Gingko Beaked Whale	*Mesoplodon ginkgodens*	-	-	Listed	-	-	Species or species habitat may occur within area	-
Gray's Beaked Whale, Scamperdown Whale	*Mesoplodon grayi*	-	-	Listed	-	-	Species or species habitat may occur within area	Species or species habitat may occur within area
Hector's Beaked Whale	*Mesoplodon hectori*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Humpback Whale	*Megaptera novaeangliae*	-	Migratory	-	Species or species habitat known to occur within area	Species or species habitat likely to occur within area	Foraging, feeding or related behaviour known to occur within area	Species or species habitat known to occur within area
		Listing Advice for *Megaptera novaeangliae* (humpback whale) (DAWE 2022a).						
Killer Whale, Orca	*Orcinus orca*	-	Migratory	Listed	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
Long-finned Pilot Whale	*Globicephala melas*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Minke Whale	*Balaenoptera acutorostrata*	-	-	Listed	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Pygmy Right Whale	*Caperea marginata*	-	Migratory	Listed	Foraging, feeding or related behaviour may occur within area	Foraging, feeding or related behaviour may occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area
Pygmy Sperm Whale	*Kogia breviceps*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area

Common Name	Scientific Name	EPBC Status			Operational Area		Planning Area	
		Listed Threatened	Listed Migratory	Listed Cetacean	Bass	Otway	Bass	Otway
Sei Whale	*Balaenoptera borealis*	Vulnerable	Migratory	Listed	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour likely to occur within area	Foraging, feeding or related behaviour known to occur within area
		Approved Conservation Advice for *Balaenoptera borealis* (sei whale) (TSSC 2015g).						
Shepherd's Beaked Whale, Tasman Beaked Whale	*Tasmacetus shepherdi*	-	-	Listed	-	-	Species or species habitat may occur within area	Species or species habitat may occur within area
Short-finned Pilot Whale	*Globicephala macrorhynchus*	-	-	Listed	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Southern Bottlenose Whale	*Hyperoodon planifrons*	-	-	Listed	-	-	Species or species habitat may occur within area	Species or species habitat may occur within area
Southern Right Whale	*Eubalaena australis*	Endangered	Migratory (as Balaena glacialis australis)	Listed	Species or species habitat known to occur within area	Species or species habitat known to occur within area	Species or species habitat known to occur within area	Breeding known to occur within area
		Conservation Management Plan for the Southern Right Whale 2011-2021 (DSEWPaC 2012a). Draft National Recovery Plan for the Southern Right Whale (DCCEEW 2022a).						
Sperm Whale	*Physeter macrocephalus*	-	Migratory	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale	*Mesoplodon layardii*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
True's Beaked Whale	*Mesoplodon mirus*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Dolphins								
Bottlenose Dolphin	*Tursiops truncatus s. str.*	-	-	Listed	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Common Dolphin, Short-beaked Common Dolphin	*Delphinus delphis*	-	-	Listed	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Dusky Dolphin	*Lagenorhynchus obscurus*	-	Migratory	Listed	Species or species habitat may occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin	*Tursiops aduncus*	-	-	Listed	-	-	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
Risso's Dolphin, Grampus	*Grampus griseus*	-	-	Listed	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area
Southern Right Whale Dolphin	*Lissodelphis peronii*	-	-	Listed	-	Species or species habitat may occur within area	Species or species habitat may occur within area	Species or species habitat may occur within area

Table 6-22: Cetacean Species Recorded during Aerial Surveys 2002–2013 in Southern Australia

Taxon	Common name	Species group*	Sightings	Individual	Mean group size (+/- SD)
Baleen whales					
Eubalaena australis	Southern right whale	SRW	12	52	4.2 +/- 4.2
Caperea marginata	Pygmy right whale		1	100	100
Balaenoptera physalus	Fin and like fin whale	ROR	7	8	1.1 +/- 0.4
B. borealis	Sei and like sei whale	ROR	12	14	1.3 +/- 0.5
B. acutorostrata	Dwarf minke whale	ROR	1	1	1
B. bonaerensis	like Antarctic minke whale	ROR	1	1	1
Megaptera novaeangliae	Humpback whale	ROR	10	18	1.8 +/- 1.0
Toothed whales					
Physeter macrocephalus	Sperm whale	ODO	34	66	1.9 +/- 2.2
Mesoplodon spp.	Unidentified beaked whales	ODO	1	20	20
Orcinus orca	Killer whale	ODO	6	21	3.5 +/- 2.8
Globicephala melas	Longfinned pilot	ODO	40	1853	46.3 +/- 46.7
Grampus griseus	Risso's dolphin	ODO	1	40	40
Lissodelphis peronii	Southern right whale dolphin	ODO	1	120	120
Tursiops spp.	Bottlenose dolphin	DOL	4	363	90.8 +/- 140.1
	Dolphins	DOL	384	22169	58 +/- 129.6
Unidentified large whales			3	3	1
Unidentified small whales			2	2	1

SRW = southern right whales; ROR = rorquals; ODO = other odontocetes; DOL = dolphins.

Table 6-23: Temporal Occurrence of Cetaceans Sighted during Aerial Surveys from November 2002 to March 2013 in Southern Australia

Species	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Southern right whale	0	0	0	0	0	0	0	0	0.8	3.1	6.8	8.8
Pygmy right whale*	0	0	0	0	0	0	0	0	19.8	0	0	0
Fin whale	0	0.10	0.14	0.07	0.08	0	0	0	0	0	0	0
Sei whale	0	0.25	0.07	0.04	0.08	0.19	0	0.21	0	0	0	0
Minke whale*	0	0	0.02	0	0	0	0.12	0	0	0	0	0
Humpback whale	0	0.05	0.07	0	0	0	0	0.11	0.99	1.0	0	0.35
Sperm whale	1.7	1.2	0.23	0.53	0.08	0.13	0.75	0.85	0	0	0	0
Unidentified beaked whale*	0	0	0.47	0	0	0	0	0	0	0	0	0
Killer whale	0	0	0.19	0	0	5.0	0	6.0	0	0.68	0	0
Pilot whale	0	59.6	7.0	19.3	4.0	39.5	0	26.3	0	0	0	0
Southern right whale dolphin*	0	59.6	0	0	0	0	0	0	0	0	0	0
Risso's dolphin*	0	0	0	0	1.7	0	0	0	0	0	0	0
Bottlenose dolphin	0	1.5	7.7	0	0	0	0	0	0	0	0	1.1
Dolphins	545.1	120.3	105.0	151.8	105.6	233.4	26.9	257.6	155.8	2.7	0	0

*Species sighted 2 or fewer times.

Note: Numbers denote animals sighted per 1,000 km survey distance for each month, pooled for all years (i.e. the 12-month period from Oct–Sep).

Table 6-24: Observed Cetaceans in the Otway Basin

Species	Jun	Jul	Aug	Sep *	Oct	Nov	Dec	Jan	Feb	Mar	Total
Blue whale	0	0	0	0	0	23	70	17	8	2	120
Southern right whale	2	0	12	13	0	0	0	0	0	0	39*
Humpback whale	3	2	0	1	0	1	0	0	0	0	7
Sperm whale	2	0	0	0	4	0	0	3	1	0	10
Pilot whale	0	0	0	0	0	70	0	0	55	0	125
Dolphins	13	298	0	33	54	620	80	672	1526	21	3317
Southern right whale	0	0	0	0	0	120	0	0	0	0	120

*September values averaged over two surveys on 1 and 11 September 2012. Totals include individuals from both September surveys

Table 6-25: Marine fauna observations at project locations during the Otway drilling project in 2021

Species	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Whales												
Blue	0	101	66	16	2	0	0	1	0	7	5	**198**
SRW	0	0	0	0	1	1	1	0	0	0	0	**3**
Humpback	0	0	7	9	25	4	2	11	14	18	5	**95**
Minke	0	0	0	3	0	0	0	0	0	0	0	**3**
Pilot	0	0	0	0	1	0	0	0	0	0	0	**1**
No ID	0	0	0	3	0	0	0	0	1	2	1	**7**
Dolphins												
Common	40	103	44	28	16	37	8	21	37	85	100	**519**
Bottlenose	12	4	1	2	1	3	2	4	3	1	7	**40**
No ID	32	27	30	10	15	11	11	5	2	2	5	**150**

Artisan-1 (3 February to 27 March) – 38 km north-northwest of the activity area;
Geographe-4/-5 (27 March to 13 November) – 15 km north of the activity area; and
Thylacine North-1 (13 November to 31 December) (ongoing at the time of data collection) - 4 km northwest of the activity area.

Antarctic Minke Whale

The Antarctic minke whale (*Balaenoptera bonaerensis*) has been found in all Australian states except the Northern Territory and occupies cold temperate to Antarctic offshore and pelagic habitats between 21°S and 65°S (Bannister et al. 1996). In summer the species is found in pelagic waters from 55°S to the Antarctic ice edge. During winter the species retreat to breeding grounds between 10-30°S, occupying oceanic waters exceeding 600 m depth and beyond the continental shelf break (DoE 2024d). Mating occurs from June through December, with a peak in August and September and calving occurs during late May and early June in warmer waters north of the Antarctic Convergence (DoE 2024d). The species primarily feeds in the Antarctic during summer on Antarctic krill and does not appear to feed much while in the breeding grounds of lower latitudes (DoE 2024d).

The Antarctic minke whale has been observed within the region however there are no BIAs in the Operational and Planning Areas. Therefore, it is likely that they would be uncommon visitors in the Planning Areas.

Blue whale

The pygmy blue whale has a foraging (annual high use area) BIA within the Otway Operational Area and both Planning Areas, possible foraging area BIA overlapping all Operational and Planning Areas, and a known foraging BIA overlapping the Otway Operational Area and both Planning Areas (Figure 6-41).

Data, as detailed in this section, suggests that blue whales are most likely to first appear during December/January and reach peak number during February/March. The likelihood and extent of the interaction is dependent on broad scale environmental factors affecting the abundance and distribution of blue whale feeding resources.

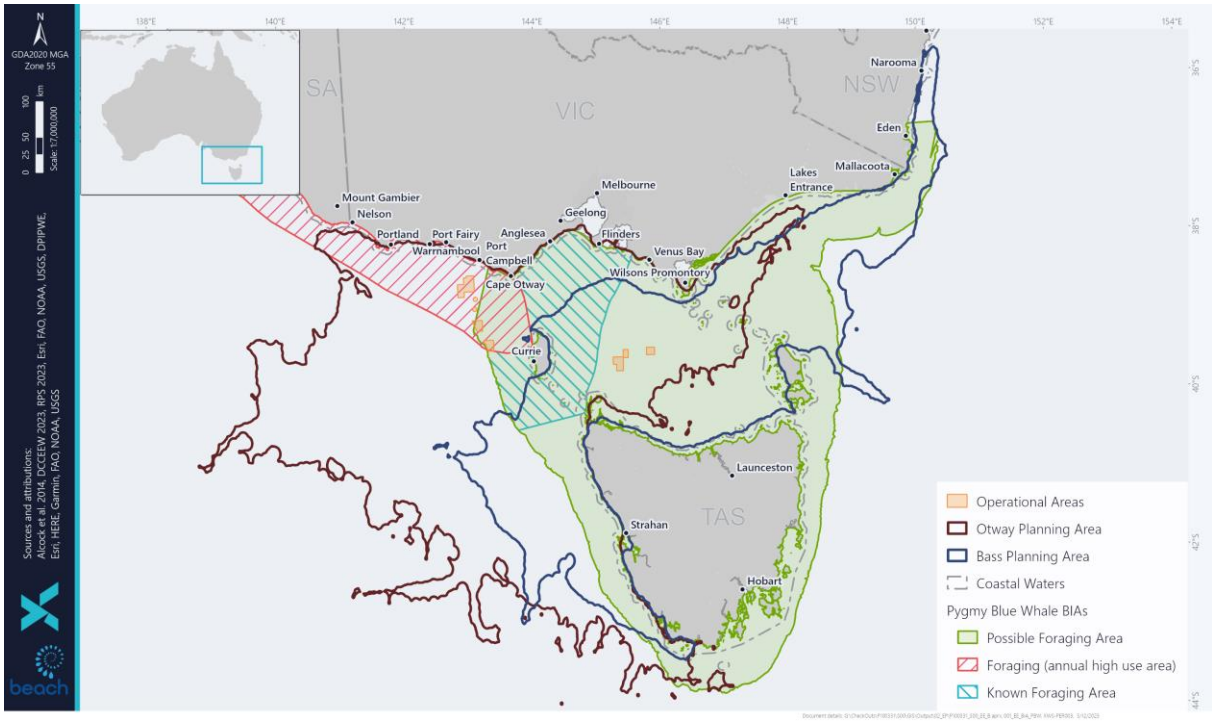


Figure 6-41: Pygmy Blue Whale BIAs within the Operational and Planning Areas

Status

The blue whale (*Balaenoptera musculus*) is listed as an endangered species under the Australian Government EPBC Act (1999) and the IUCN Red List. There are two subspecies of blue whales that use Australian waters (including Australian Antarctic waters), the pygmy blue whale (*B. m. brevicauda*) and the Antarctic blue whale (*B. m. intermedia*). Reference to blue whale unless otherwise specified is generally synonymous to both species. The blue whale has a recovery plan that identifies threats and establishes actions for assisting the recovery of blue whale populations using Australian waters (CoA 2015).

Population

The Antarctic blue whale was extremely abundant until the early 20th century when they were hunted to near extinction. Approximately 341,830 blue whale takes were recorded by commercial whaling in the Antarctic and sub-Antarctic in the 20th century, of which 12,618 were identified as pygmy blue whales (Branch et al. 2004). The current global population of blue whales is uncertain but is plausibly in the range of 10,000 to 25,000, corresponding to about 3-11% of the 1911 estimated population size (Reilly et al. 2008). The Antarctic blue whale subspecies remains severely depleted from historic whaling and its numbers are recovering slowly. The Antarctic blue whale population is growing at an estimated rate of 7.3% per year, but it was hunted to such a low level that it remains at a tiny fraction of pre-whaling numbers (Branch et al. 2004). Recent studies suggest an updated rate of increase in population growth of 12.6%, consistent with growth rates in waters off the south of Australia (McCauley et al. 2018). The updated abundance estimate uses acoustic chorus squared pressure levels to estimate growth rate off Portland (McCauley et al. 2018). This growth rate considers the number of whales calling assuming the range distribution of whales, source levels, sound propagation and calling behaviour were all similar between years.

Genetic analysis has shown that pygmy blue whales which feed off the Perth Canyon, WA and the Bonney Upwelling, SA and Victoria constitute the same population (Attard et al. 2010, in CoA 2015). Photo identification and genomic studies suggest population exchange between the two feeding grounds of the Bonney coast upwelling and the Perth Canyon (Attard et al. 2018).

Global pygmy blue whale abundance estimates range from 2,000 to 5,000 individuals (Reilly et al. 2008). Abundance estimates based on photo-identification mark-recapture from 1999/2000 to 2004/2005 for blue whales in the Perth Canyon were between 532 and 1,754 individuals, which generally agree with acoustic abundance estimates of 662 to 1,559 calling blue whales migrating south in 2004 past Exmouth in Western Australia and a 1992/1993 season cruise which estimated 671 (95% interval 289–1,557) individuals offshore of southern Western Australia (35–45° South, 115–125° East) (CoA 2015).

Distribution

The blue whale is a cosmopolitan species, found in all oceans except the Arctic, but absent from some regional seas such as the Mediterranean, Okhotsk and Bering seas. Little is known about mating behaviour or breeding grounds. The pygmy blue whale is mostly found north of 55°S, while Antarctic blue whales are mainly sighted south of 60°S in Antarctic waters. Pygmy blue whales are most abundant in the southern Indian Ocean on the Madagascar plateau, and off South Australia and Western Australia, where they form part of a more or less continuous distribution from Tasmania to Indonesia. The Otway region is an important migratory and foraging area for blue whales, as shown by passive acoustic monitoring and aerial surveys (Gavrilov 2012; McCauley et al. 2018; Gill et al. 2011).

Underwater acoustic monitoring programs have detected Antarctic and pygmy blue whale calls in the Otway Region. Acoustic detection of Antarctic blue whales indicates that they occur along the entire southern coastline of Australia (McCauley et al. 2018). Pygmy and Antarctic blue whales were acoustically detected by Origin Energy between February and October 2011 in the Otway Basin, east of the Thylacine-A wellhead platform. The presence of Antarctic blue whales in the area is considered rare (Gavrilov 2012). However, recent acoustic studies have estimated an increase in the abundance of blue whales off Portland, Victoria (McCauley et al. 2018). From 2009-2016 Antarctic blue whale calls were received via deep sound channel propagation south of Portland and the maximum chorus levels occurred from late February to late June with yearly increases in chorus levels (McCauley et al. 2018).

Important foraging grounds for blue whales include the Great Australian Bight, South Australia and off Portland Victoria where blue whales visit between December and June to forage on the inshore shelf break (Figure 6-42). The time and location of the appearance of blue whales in the east generally coincides with the upwelling of cold water in summer and autumn along this coast (the Bonney Upwelling) and the associated aggregations of krill that they feed on (Gill and Morrice 2003). The Bonney Upwelling generally starts in the eastern part of the Great Australian Bight in November or December and spreads eastwards to the Otway Basin around February as southward migration of the subtropical high-pressure cell creates upwelling favourable winds. Sighting data indicates that blue whales are seasonally distributed (Gill et al. 2011, McCauley et al. 2018).

The seasonal distribution and abundance of blue whales are variable across years and influenced by climate variables. The time and location of the appearance of blue whales in the east generally coincides with the upwelling of cold water in summer and autumn along the coast (the Bonney coast upwelling) and the associated aggregations of krill that they feed on (Gill and Morrice 2003). The

Bonney coast upwelling generally starts in the eastern part of the Great Australian Bight in November or December and spreads eastwards to the Otway Basin around February as southward migration of the subtropical high-pressure cell creates upwelling favourable winds.

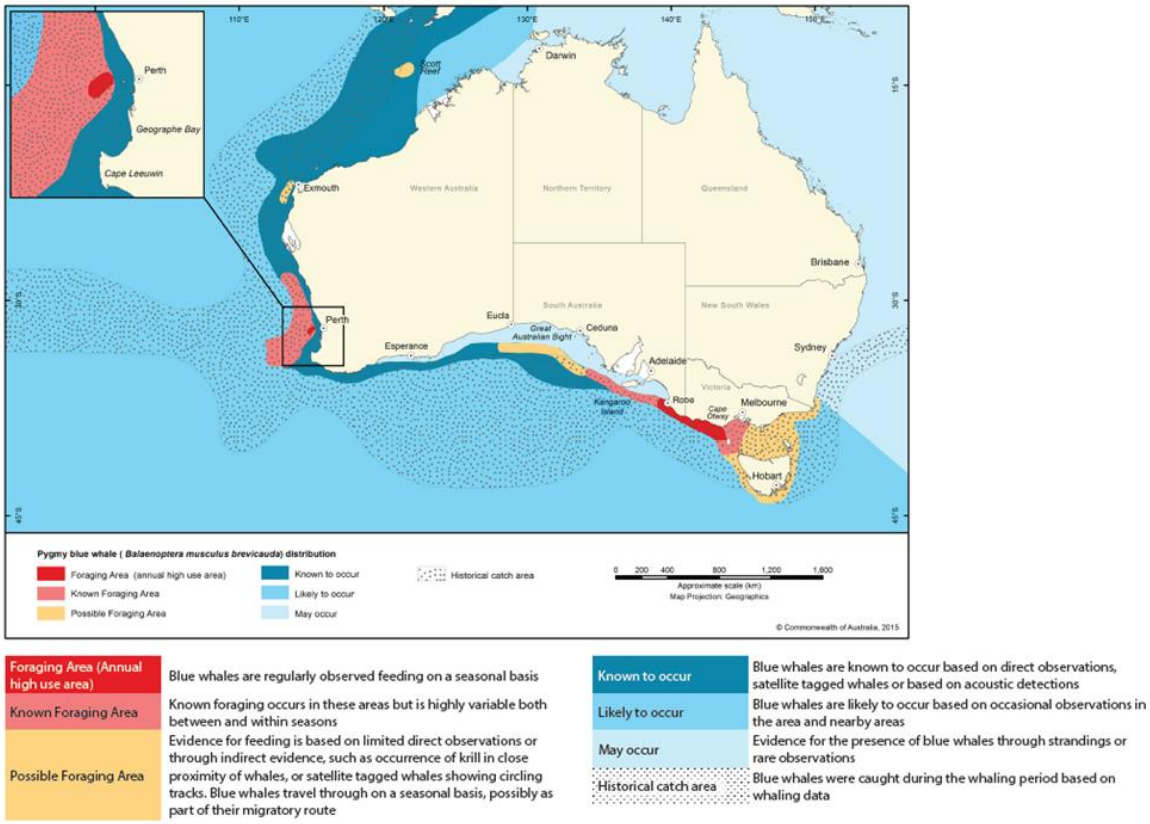
There are two known seasonal feeding aggregations areas in Australia, the Bonney Coast Upwelling KEF and adjacent waters off South Australia and Victoria (Figure 6-48), and the Perth Canyon KEF and adjacent waters in Western Australia. The abundance of pygmy blue whales varies within and between seasons, but they typically forage in the Otway region between January and April. Foraging of pygmy blue whales is known to occur in Bass Strait and the west coast of Tasmania where they have been recorded diving at depth presumably feeding (CoA 2015). McCauley et al. (2018) suggests that acoustic detection of pygmy blue whales indicate they predominantly occur west of Bass Strait (Figure 6-49). Acoustic detections of pygmy blue whales off Portland Victoria correlated with upwelling indicators in the Bonney coast upwelling in late summer to autumn (February-April) (McCauley et al. 2018). The two pygmy blue whale call types and the Antarctic blue whale call have been detected in central Bass Strait. One occasion all three types were detected between April and June with more commonly two calls present over this period during other years (Figure 6-49).

Pygmy blue whales have three migratory stages around Australia; the "southbound migration stage" where predominantly between October to December (sometimes into January) whales travel from Indonesian waters down to the WA coast, the "southern Australian stage" where between January and June whales spread across the southern Australian waters, and the "northbound migration stage" where whales travel back up to Indonesia between April and August. The "southern stage" involves animals searching for prey. The Bonney coast upwelling is a strong predicator of pygmy blue whale presence at Portland where whale presence in the area is linked to prey availability (McCauley et al. 2018). Passive acoustic monitoring in southern Australia during 2000-2017 focused on the distribution and population parameters of both subspecies of blue whales in southern and western Australia. In Portland sea noise data was available from 2009 to early 2017. In 2009 and 2011 pygmy blue whales arrived in November or December whereas in the other years, calls were not detected until January or February. There was substantial variation in presence within a season, with some whales remaining in the Portland detection area until mid-June each year. Acoustic loggers located east of the Thylacine platform from February to October 2011 detected pygmy blue whales between February and early June, with the greatest abundance from March to mid-May.

It is difficult to predict numbers within a season but when correlated across seasons the strength and persistence of the Bonney coast upwelling, given by time integrated water temperature, significantly correlates with time integrated number of individual whales calling from the same site. The upwelling index explains 83% of the variability in blue whale calling presence across seasons when using seasonal whale counts (not corrected for population growth). When a growth rate of 4.3% is applied a correlation of 90% of the variance in seasonal occurrence is predicted by the upwelling index. The number of pygmy blue whale calling in Portland could be expected in increase yearly with whale population growth (McCauley et al. 2018).

Photo identification, genetics and telemetry studies provide information on whale movements and connectivity. Photo identification and genomic studies suggest population exchange between the two feeding grounds of the Bonney coast upwelling and the Perth Canyon (Attard et al. 2018). A pygmy blue whale was tagged in 2014 north of the Perth Canyon and travelled a total distance of 506.3 km in 7.6 days, indicating the vast distances that the large marine mammals can travel in a short amount of time (Owen et al. 2016). While migrating the whale made dives at depths just below the surface which

likely reduces energy expenditure but also increases the risk of ship strike greatly for longer periods than previously thought.



Foraging Area (Annual high use area)	Blue whales are regularly observed feeding on a seasonal basis
Known Foraging Area	Known foraging occurs in these areas but is highly variable both between and within seasons
Possible Foraging Area	Evidence for feeding is based on limited direct observations or through indirect evidence, such as occurrence of krill in close proximity of whales, or satellite tagged whales showing circling tracks. Blue whales travel through on a seasonal basis, possibly as part of their migratory route

Known to occur	Blue whales are known to occur based on direct observations, satellite tagged whales or based on acoustic detections
Likely to occur	Blue whales are likely to occur based on occasional observations in the area and nearby areas
May occur	Evidence for the presence of blue whales through strandings or rare observations
Historical catch area	Blue whales were caught during the whaling period based on whaling data

Figure 6-42: Pygmy Blue Whale Foraging Areas around Australia (CoA 2015)

Foraging

There are two known seasonal feeding aggregations areas in Australia, the Bonney Coast Upwelling KEF and adjacent waters off South Australia and Victoria and the Perth Canyon KEF and adjacent waters in Western Australia (Figure 6-42). Foraging of pygmy blue whales is known to occur in Bass Strait and the west coast of Tasmania where they have been recorded diving at depth presumably feeding (DoE 2015). Blue whales are known as 'constant foragers'; their ecology in feeding grounds consists of constantly searching for patchily distributed krill resources, preferably those that reward the effort involved in consuming them (Torres et al. 2020). They are physically well-adapted for rapid movement between widely separated foraging areas (Woodward et al. 2006), but when they enter areas where krill may occur, they carry out zig-zagging 'area-restricted searches' (ARS) patterns until either they find prey, or exhaust local possibilities, and move on to another possible foraging ground based on past experience (Abrahms et al. 2019). Based on this it is assumed that once the blues have finished feeding, they will move from the feeding area to commence searching for another area.

Diving behaviour of blue whales associated with feeding at depth was observed by Gill & Morris (2003) in the Otway region, who note that blue whales dived steeply, submerging for 1–4 minutes, then returned to the surface. Tagging of a pygmy blue whale at the Perth Canyon identified 1677 dives over the tag duration (7.6 days) (Owen et al. 2016). The duration of dives was:

- Feeding - mean of 7.6 minutes, maximum of 17.5 minutes.

- Migratory – mean of 5.2 minutes, maximum of 26.7 minutes.
- Exploratory – mean of 8.6 minutes, maximum of 22.05 minutes.

Tagging of 13 pygmy blue whales (five of which had tags that monitored dive depth and duration) in the Bonney upwelling identified (Möller et al. 2015):

- Whales predominantly carried out area-restricted search (presumably foraging) with generally shallow and short dives. However, dives were generally deeper at night compared to during the day.
- Whales performed mostly square shaped dives that were shallow in depth and short in duration.
- Dives recorded to a maximum of 492 m (mean = 59.5 m ± 94.3), and for a maximum duration of 112 minutes (mean = 6.1 minutes ± 5.2).

Although the maximum recorded dive time was 112 minutes, the mean dive time of 6.1 minutes ± 5.2 provides confidence that the typical dive time is less than 30 minutes (Möller et al. 2015). Tagging of eight blue whales off California (Irvine et al. 2019) identified that dive durations were as long as 30.7 minutes, and no feeding lunges were recorded during dives >20 minutes in duration.

Surveys
Several aerial and noise studies of blue whales within the Otway Basin have been conducted and are summarised below.

Aerial Surveys (2001-02 to 2006-07)
Gill et al. (2011) undertook 69 seasonal aerial surveys for blue whales between Cape Jaffa and Cape Otway over six seasons (2001-02 to 2006-07). This study found that the general pattern of seasonal movement of blue whales is from west to east, with whales foraging in between the Great Australian Bight and Cape Nelson in November and spreading further east in December. Whales are typically widely distributed throughout Otway shelf waters from January through to April (Gill et al. 2011) (Figure 6-44 and Figure 6-45).

Blue whale encounter rates in the central and eastern study (Cape Nelson to Cape Otway) area by month is shown in Figure 6-43 with sighting and effort data presented geographically in Figure 6-44 and Figure 6-45. Data is pooled for all seasons, for central and eastern areas, overlaid on gridded aerial survey effort (10 km x 10 km squares), represented as minutes flown per grid square (key, upper right). Thick solid lines represent 50% and 95% probability contours for blue whale distribution from density kernel analysis. Dashed lines are central and eastern boundaries (Gill et al. 2011). The Otway Planning Area is within the central and eastern areas and the Otway Operational Area overlaps the eastern area.

There had been fewer than 50 sightings of blue whales in Bass Strait up to the year 1999, but since that time feeding blue whales have been more regularly observed in the Discovery Bay area and more generally along the Bonney coast from Robe to Cape Otway. Gill et al. (2011) found that across the eastern zone (Cape Nelson to Cape Otway), there were no blue whale sightings in November (2001-2007) despite significant effort (Figure 6-44).

Based on the pooled aerial survey data (2001-2007), encounter rates increased from 1.6 whales per 1,000 km in December, to 9.8 whales per 1,000 km in February, decreased slightly to 8.8 whales per

1,000 km in March, then declined sharply to a single sighting for May (0.4 whales per 1,000 km) (Gill et al. 2011). A mean blue whale group size of 1.3±0.6 was observed per sighting with cow-calf pairs observed in 2.5% of the sightings. Gill et al. (2011) also identified that 80% of blue whale sightings are encountered in water depths between 50 and 150 m; 93% of sightings occurred in water depths <200 m and 10% of sightings occurred within 5 km of the 200 m isobath in the eastern and central zones.

The data from Gill et al. (2011) shows:

- Blue whales are typically widely distributed throughout central and eastern areas shelf waters from January through to April.
- Blue whale numbers are significantly lower in November, December and January in the eastern area compared to the central area.
- No blue whales were sighted in the eastern area during November for any season despite significant effort. Pooled monthly encounter rates increased from 1.6 whales 1,000 km–1 in December, 5 whales 1,000 km–1 in January, peaked at 9.8 whales 1,000 km–1 in February, dropped slightly to 8.8 whales 1,000 km–1 in March, then declined sharply to a single sighting for May (0.4 whales 1,000 km–1).
- Encounter rates in central and eastern zones peaked in February, coinciding with peak upwelling intensity and primary productivity.

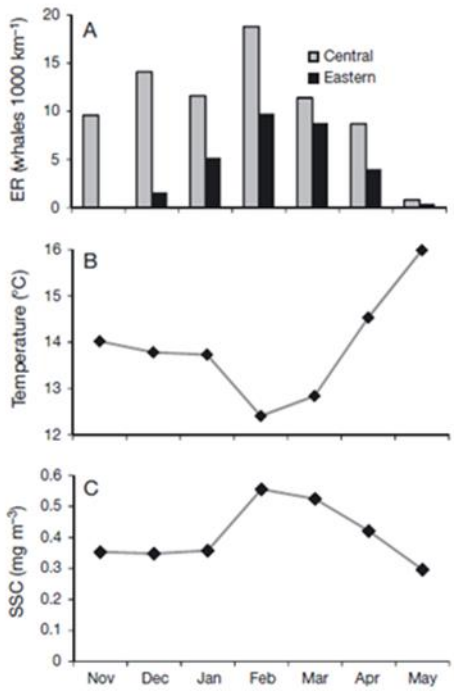


Figure 6-43: Blue Whale Encounter Rates in the Central and Eastern Study (Cape Nelson to Cape Otway) Area by Month (Gill et al. 2011)

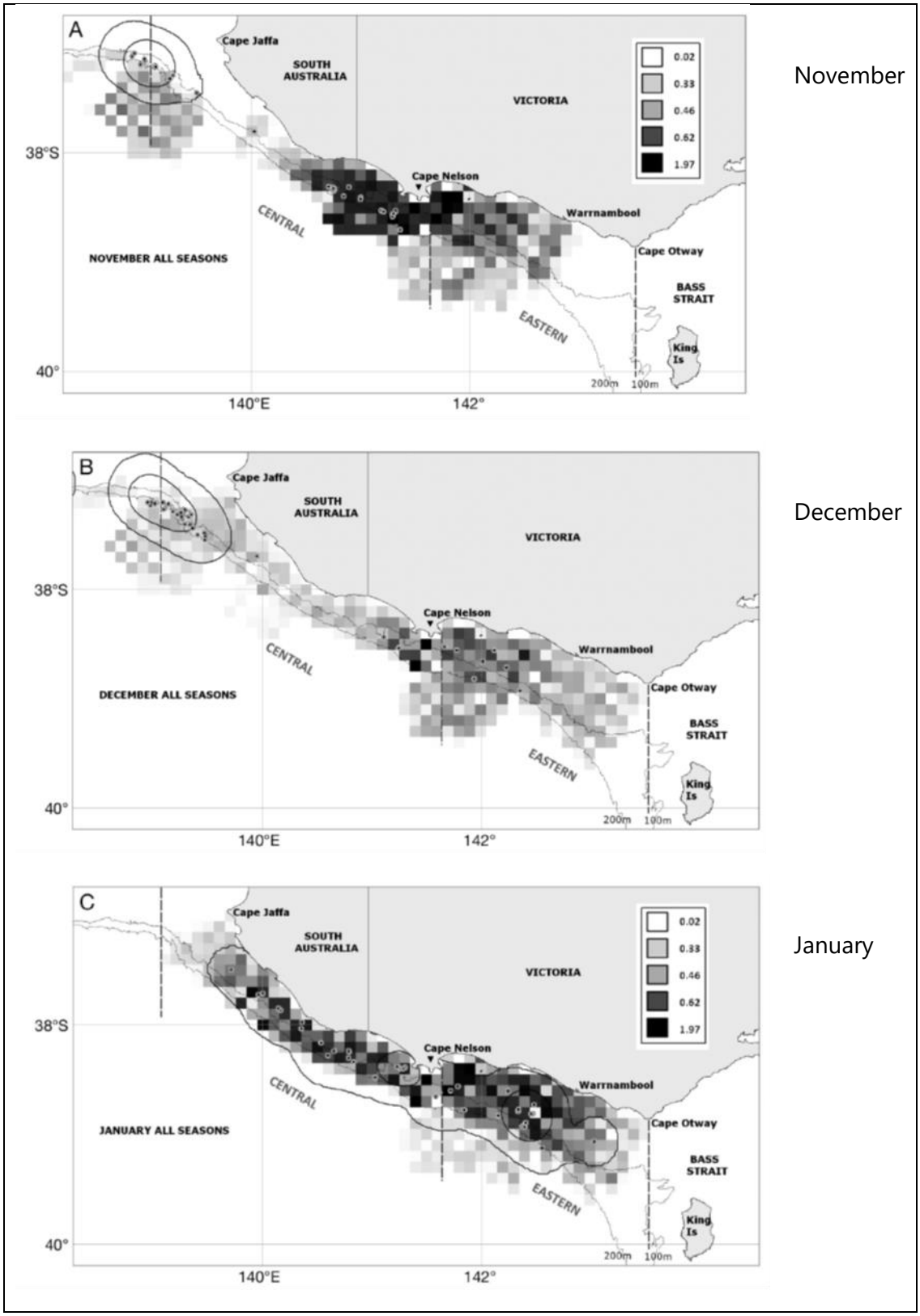


Figure 6-44: Blue Whale Sightings in the Otway Basin (Nov, Dec, Jan) (Gill et al. 2011)

Note: Dots represent blue whale sightings while squares are aerial survey effort (10 km x 10 km squares) represented as minutes flown per grid square (key, upper right corner of the November and January figures).

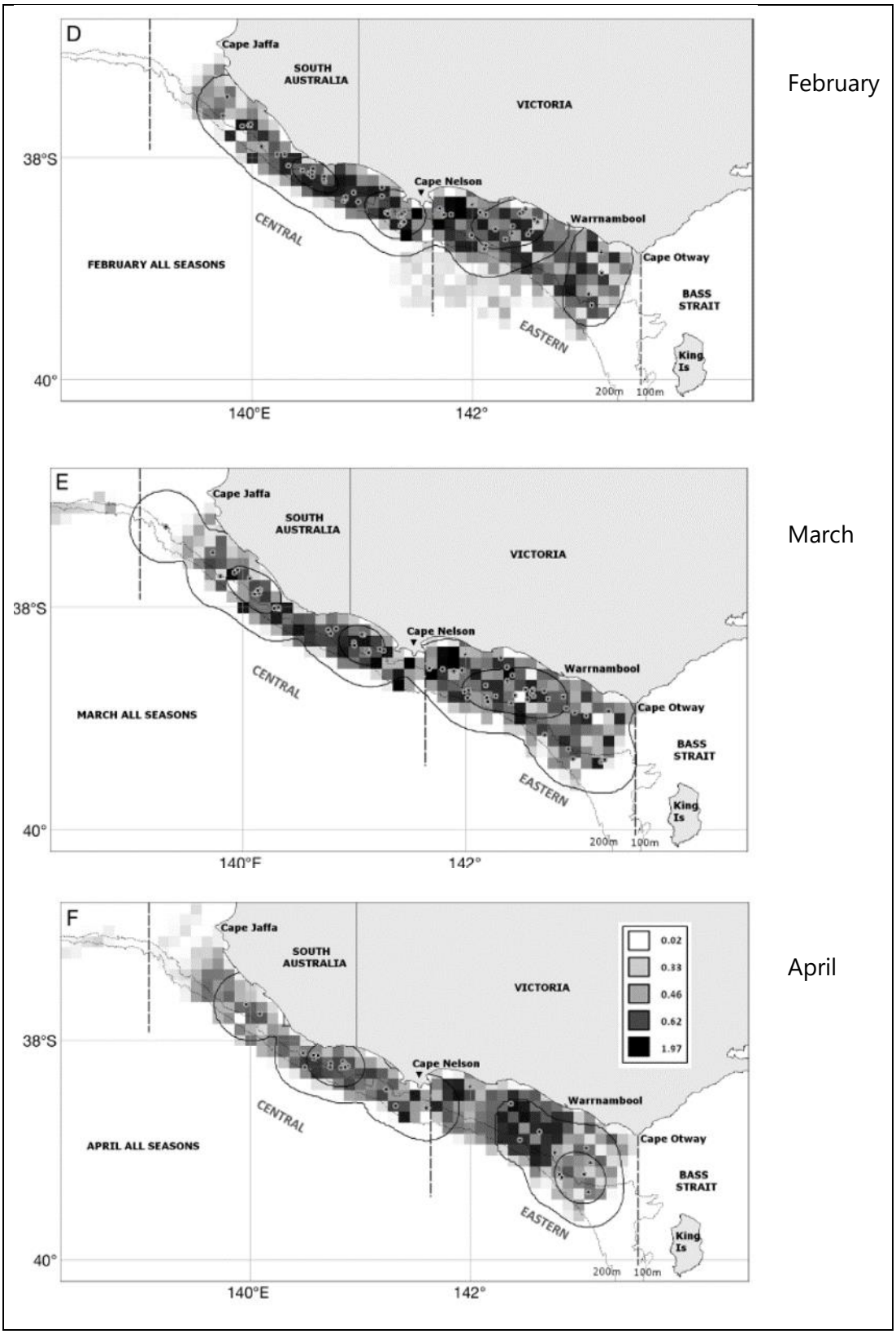


Figure 6-45: Blue Whale Sightings in the Otway Basin (Feb, Mar, Apr) (Gill et al. 2011)

Note: Dots represent blue whale sightings while squares are aerial survey effort (10 km x 10 km squares) represented as minutes flown per grid square (key, upper right corner of the April figure).

Origin Energy Surveys (2010-2014)

There were no confirmed sightings of blue whales during Origin's Speculant 3D Transition Zone marine seismic survey in November and December 2010, the Astrolabe 3D seismic survey undertaken in early November 2013 (RPS 2014) or during the Enterprise 3D seismic survey undertaken in late October and early November 2014 (RPS 2014).

From February to October 2011 Origin located an array of marine loggers east of the Thylacine platform to document nearby ambient marine noise, detect cetaceans and measure acoustics associated with the Origin 3D Bellerive Marine Seismic Survey. Pygmy and Antarctic blue whales were acoustically detected in the monitored area. Pygmy blue whales were observed from early February to early June being abundant from March to mid-May. Rare calls from Antarctic blue whales were observed in June.

Aerial surveys were commissioned by Origin and undertaken during 2011 and 2012 by the Blue Whale Study. During five aerial surveys between 8 and 25 February 2011, 56 blue whales were sighted. Most of the sightings were at inshore areas between Moonlight Head to Port Fairy with whales apparently aggregating along and offshore of the boundary between the runoff plume from major flooding prevalent at the time and adjacent seawater. Figure 6-46 shows sightings from 14 February 2011 (Gill 2020).

The 2012 aerial surveys found that blue whales were common in the eastern upwelling zone during November and December 2012 (Figure 6-46 and Figure 6-47). In November, an estimated 21 individual blue whales were sighted, with most sightings near the 100 m isobath or deeper. December 2012 surveys identified 70 blue whales foraging along the edge of the continental shelf west of King Island. This was the largest recorded aggregation of blue whales during any aerial surveys of the Bonney coast upwelling since 1999 (Gill 2020).

The large numbers of whales found in this area during November and December indicated high productivity, although the krill was too deep to be seen from the air. Subsequent surveys in the same area for Origin Energy in early 2013 resulted in 17 blue whales sighted in January, eight in February, and two (a cow and calf) in March 2013, despite the extremely warm surface conditions. The high productivity of this area seen in November-December 2012 evidently tailed off during the next few months (Gill 2020).

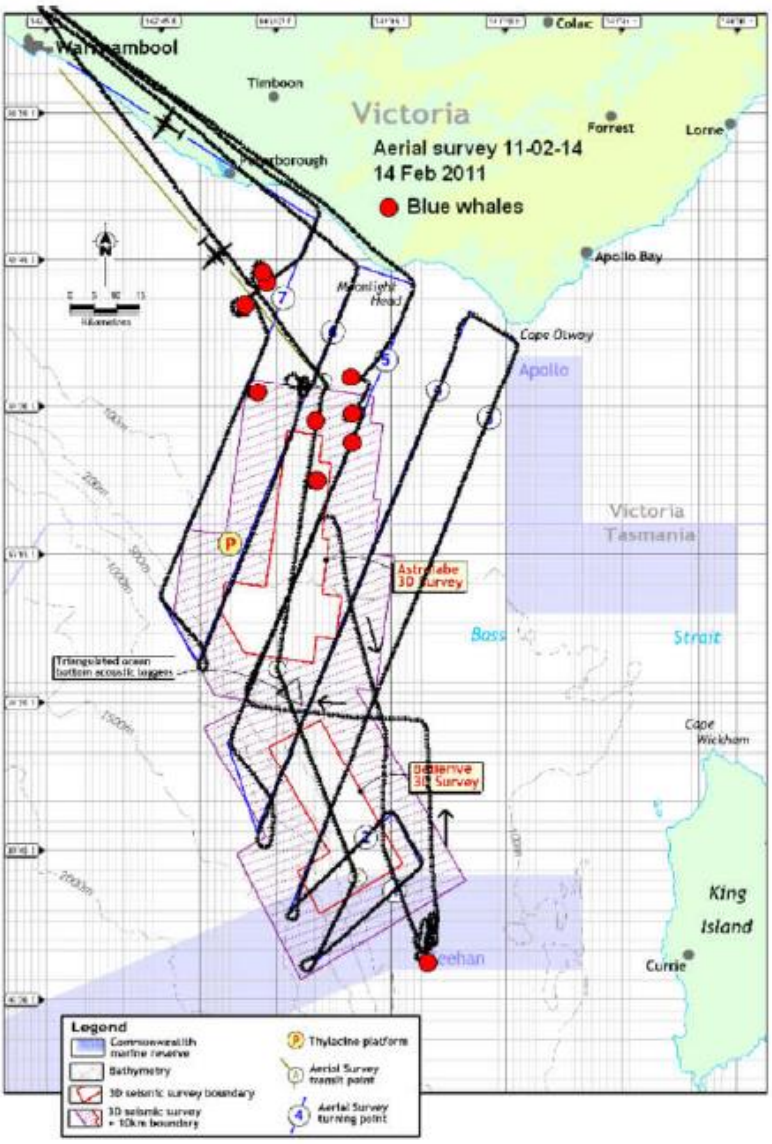


Figure 6-46: Blue Whale Sightings during an Aerial Survey for Origin Energy in February 2011 (Gill 2020)

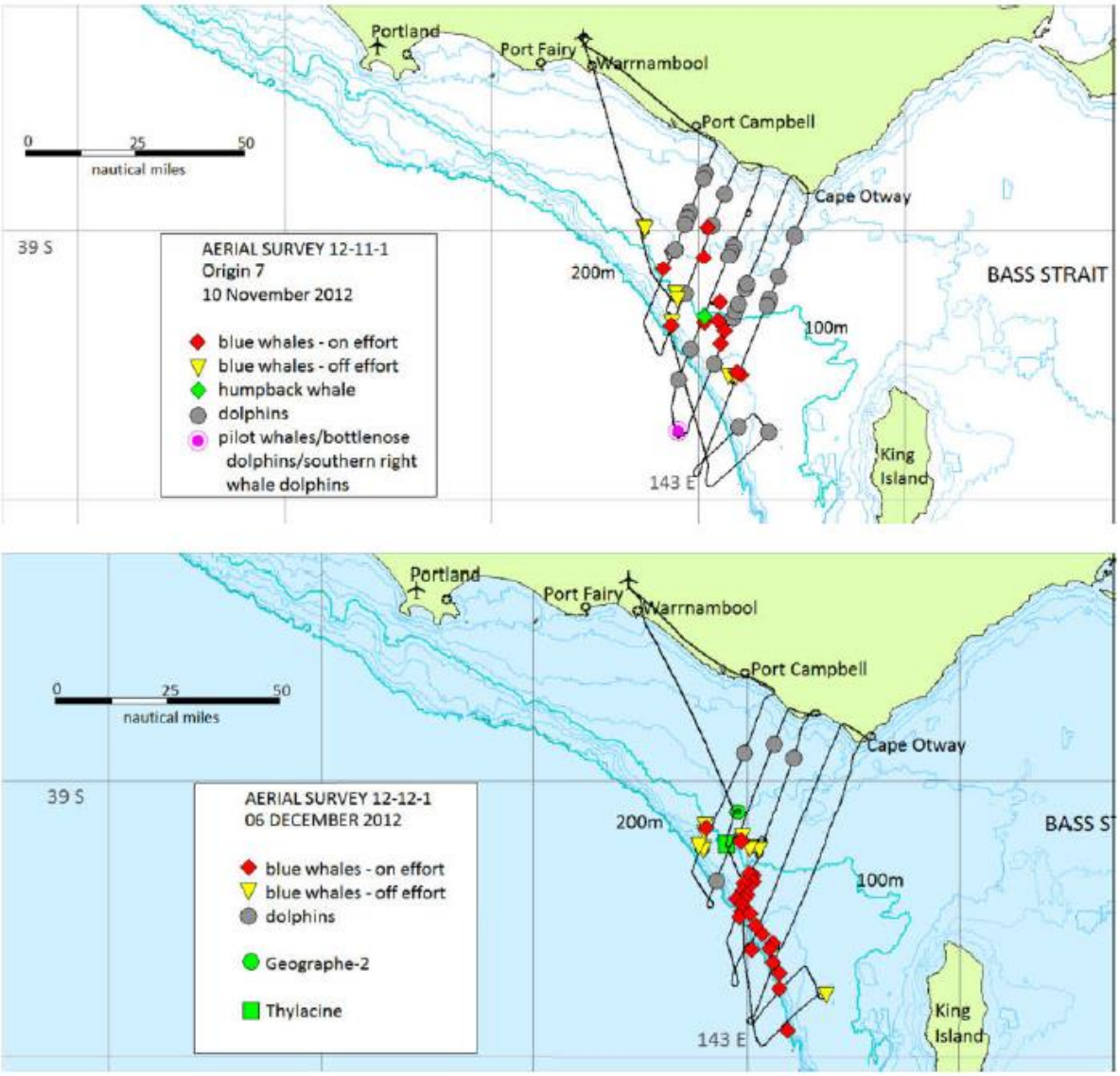


Figure 6-47: Blue Whale Sightings during an Aerial Survey for Origin Energy in November and December 2012 (Gill 2020)

<u>Tagging Study (2015-2016)</u>
Möller et al. 2020 analysis data from the tags of 13 pygmy blue whales who were tagged in the Bonney upwelling region in January 2015 with tags transmitting up to March 2016. In summary:

Whale movements in the Great Southern Australian Coastal Upwelling System (GSACUS) ranged mostly from eastern South Australia, over the continental shelf south of Kangaroo Island, to between mainland Australia and Tasmania), with a few whales performing some movements to the continental slope and the deep-sea (Figure 6-48).

In the GSACUS, most tagged whales remained over the continental shelf, utilising this region from at least January to July. This was the area of highest occupancy by the whales, with one whale returning to the Bonney Upwelling in January the year after and remaining there for at least three months. This timing coincides with the upwelling season, which generally occurs from November to March each year.

A low probability of area restricted search (ARS) behaviour (i.e. high probability of transiting behaviour) was mainly observed between April and June, and then between November and December, suggesting that the pygmy blue whales were mainly migrating during those times.

Seascape correlates of ARS behaviour for these whales suggested the importance of sea surface temperature, sea surface height anomaly, wind speed and chlorophyll a concentration as proxies of upwelling productivity and presence of krill patches.

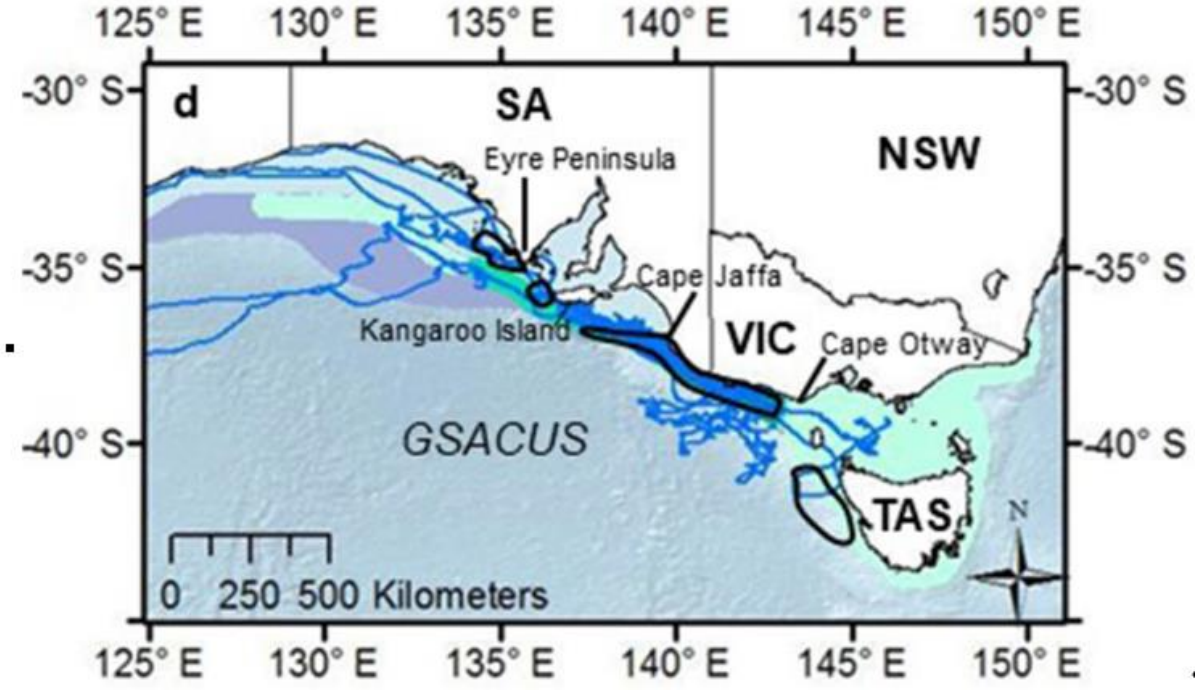


Figure 6-48: Tracks of 13 Pygmy Blue Whales in the GSACUS (Möller et al. 2020)

Passive Acoustic Recorders (2009-2017)

Between 2009 and 2016 the Integrated Marine Observing System (IMOS) has been recording underwater sound south of Portland, Victoria. McCauley et al. (2018) analysed the data from to look at blue whale presence, distribution, and population parameters.

McCauley et al. (2018) analysed data from passive acoustic recorders that were located around Australia to look at blue whale presence, distribution and population parameters. The primary sites comprised central Bass Strait, western Tasmania, the southeast Australian coast and the Great Australian Bight area. Each study area had multiple receivers and may have had several sites sampled within the area. Temporal sampling focussed on the southern Australian site south-west of Portland, Victoria. Data was used from 2004 to 2016. The study concluded:

- Antarctic blue whale calls were received via deep sound channel propagation south of Portland and the maximum chorus levels occurred from late February to late June with yearly increases in chorus levels (McCauley et al. 2018). McCauley et al. (2018) suggests that acoustic detection of Antarctic blue whales indicate they predominantly occur along the entire southern coastline.

- Pygmy blue whales have three migratory stages around Australia; the "southbound migration stage" were predominantly between October to December (sometimes into January) whales travel

from Indonesian waters down to the WA coast, the "southern Australian stage" where between January and June whales spread across the southern Australian waters, and the "northbound migration stage" where whales travel back up to Indonesia between April and August.

- The "southern stage" involves animals searching for feeding sites, feeding and then marking their way north towards June.
- Along the southern Australian coastline pygmy blue whales are most frequently detected towards the east along the Bonney coast over late February to early June, utilising secondary productivity produced by a seasonal upwelling event.
- Within a season it is difficult to predict whale numbers and their specific locations, but when correlated across seasons the strength and persistence of this upwelling event as given by time integrated water temperature south of Portland, significantly correlates with time integrated number of individual whales calling from the same site.
- The Bonney coast upwelling is a strong predicator of pygmy blue whale presence at Portland where whale presence in the area is linked to prey availability.

Sea noise data was available from the Portland site from 2009 to early 2017 detailed:

- In 2009 and 2011 pygmy blue whales arrived in November or December whereas in the other years, calls were not detected until January or February (Figure 6-49). There was substantial variation in presence within a season, with some whales remaining in the Portland detection area until mid-June each year.
- There was considerable variability in whale persistence and presence within a season (Figure 6-49) with no consistent trend other than a peak in presence somewhere over February to June.
- It is difficult to predict numbers within a season but when correlated across seasons the strength and persistence of the Bonney coast upwelling, given by time integrated water temperature, significantly correlates with time integrated number of individual whales calling from the same site. The upwelling index explains 83% of the variability in blue whale calling presence across seasons when using seasonal whale counts (not corrected for population growth). When a growth rate of 4.3% is applied a correlation of 90% of the variance in seasonal occurrence is predicted by the upwelling index.
- The number of pygmy blue whale calling in Portland could be expected in increase yearly with whale population growth.

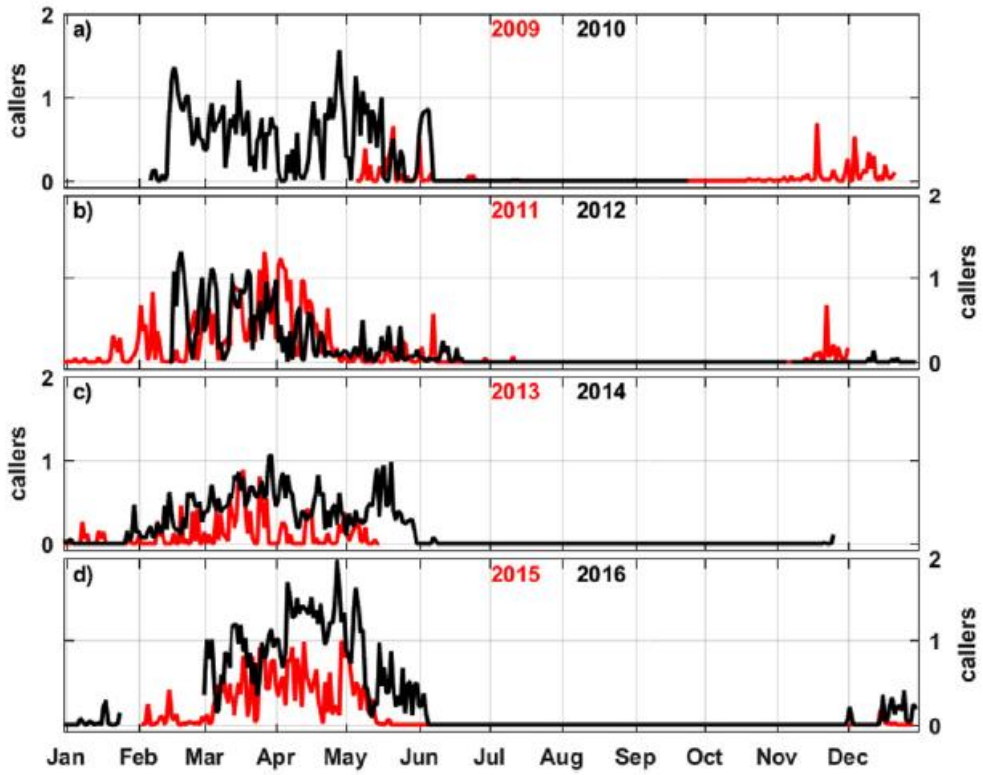


Figure 6-49: Mean Number of Individual Pygmy Blue Whales Calling (McCauley et al. 2018)

Beach Surveys (2019-2022)

During the Beach Otway Development Seabed Survey (November 2019 to January 2020) there were four sightings of blue whales within 3.5 km of the Thylacine Platform in November 2019 and one sighting in January 2020 about 1 km from the Artisan well location. The whales were identified as swimming.

As detailed in Section 6.3.2, JASCO completed a monitoring study for Beach in relation to exploration drilling activities at the Artisan-1 well from the 1 Feb to 6 April 2021 (McPherson et al. 2021). Songs of pygmy blue whales were detected sporadically through February and the first half of March. By the end of March, the signals were present in almost every hour of recording. This pattern of occurrence was reflected across all recording stations. The data were too sparse to confirm anything about animal movements.

Beach commenced its Otway drilling program in February 2021 in the Otway Development Area, including:

- Exploration drilling at the Artisan-1 location (2 February 2021 – 27 March 2021).
- Development drilling, well abandonment, subsea installation, and commissioning activities in the Geographe field (27 March 2021 – 13 November 2021).
- Development drilling of the Thylacine North-1 well (16 November 2021 – 11 January 2022).
- Development drilling of the Thylacine West wells (23 January 2022 – 30 April 2022).

Drilling was undertaken by offshore drilling unit (MODU), the *Ocean Onyx*. The Blue Whale Study was engaged to undertaken aerial surveys from February to May 2021 to identify blue whale and krill surface swarms within the Otway Development Area and outside of this area. A preliminary data summary provided to Beach detailed:

- Nine aerial surveys were undertaken from 25 February to 21 May 2021.
- There were 34 blue whale sightings consisting of 43 individuals.
- The highest number of blue whale sightings was on 7 April with 19 blue whales sighted.
- The first blue whale was sighted 25 February and final blue whale sighted 7 April.
- Blue whales and krill surface swarms were distributed throughout the area surveyed.

Throughout the drilling campaign marine fauna observers (MFOs) were employed (January 2021 to April 2022). to ensure activities complied with Beach's Whale Management Standard Operating Procedure (WMSOP) (Document No.: S4000AF726092). The data collected includes the numbers of blue whales observed at varying distances from the MODU, based on the WMSOP management zones, during different drilling activities, along with information on whether the whale was observed to be approaching the MODU or moving away from it. They also collect additional data whilst in transit, or at distances outside of the zones specified in the WMSOP. Observations are based on distances of:

- 0 – 500 m
- 501 – 1,500 m
- 1,501 – 2,000 m
- 2,001 – 3,000 m
- 3,000 m

The total number of blue whales sighted by the aerial surveys and by MFOs was 324 individuals (Figure 6-50), with a peak of 102 whales in March 2021 (note that the period February-May 2021 includes aerial survey data). Over this period, whales were observed in most months apart from July, August, and October.

Figure 6-51 shows all whale sightings by MFOs between 2 February 2021 and 31 March 2022 across all well locations. Note that many observations were made whilst in transit.

The Lead MFO provided summary data collected under the WMSOP for the period between 2 February 2021 and 31 March 2022. This was reviewed and a brief analysis undertaken.

During this period, 127 blue whales were observed within 3 km of the MODU (Table 6-26). Thirty-two whales were first detected within 1,500 m of the MODU. Sixty-two were first detected at 1,501 to 3,000 m. Thirty-three were first observed to be further than 3 km from the MODU before moving towards it. The total number of blue whales observed to move towards the MODU (following first detection) was 70 (55%); 57 were observed to move away from the MODU (45%).

Of the 94 whales first detected within 3,000 m of the MODU, 32 were observed within 1,500 m and 62 observed between 1,501 and 3,000 m. The number of blue whales/km^2 observed was 2.7x higher in the 0-1,500 m zone (7.8 whales/km^2) than in the 1,501 to 3,000 m zone (2.9 whales/km^2) (Table 6-26).

It would be expected that the number of blue whales/km^2 would be the same in all zones if underwater noise was not displacing blue whales from the area. Alternatively, if whales are being displaced then it would be expected that the number of blue whales/km^2 would increase with increasing distance from the MODU. The apparent increased density of whales within 1,500 m of the MODU in Table 6-26 can be explained by the fact that it is harder to detect whales at greater distances (i.e., the probability of detection is inversely related to distance). To correct for this a detection function is needed. The data collection methods employed by the MFOs were not designed to enable detection functions to be generated so surrogate detection functions were applied.

Williams et al. (2016) collected 3,262 vessel-based observations from 2008 to 2015 of humpback whales in and near Glacier Bay National Park, Alaska, which is a site of a regionally important feeding aggregation of humpback whales. They analysed this data (85% truncated at 4,565 m) to generate detection functions to understand the probability of whale detection and how it varies with distance under different environmental and biological characteristics. Figure 6-52 shows the detection function for all data; Figure 6-53 shows the detection functions under different visibility conditions; Figure 6-54 shows the detection functions for different group sizes. Shaded areas show 95% confidence intervals. Arrows identify detection probability at 1,000 m reference distance.

Detection probability of surfacing whales decreased markedly with increasing distance from the ship. They found visibility and group size to be the most important variables influencing detection. The worst visibility conditions reduced detection probability to near 0 at 1000 m. Compared to detecting a single whale, a group of 2 or 3 whales almost doubled detection probability at 1000 m. Surface active behaviour increased detection compared to spouting while showing no flukes. In south-eastern Alaska, single whales that spouted during excellent visibility conditions were most commonly encountered and had a detection probability of 0.569 at 1000 m (Williams et al. 2016).

The Lead MFO for the Otway drilling program advised that they were only able to detect whales further than 3 km on 25% of occasions. The detection function from Williams et al. (2016) which best matches the MFOs advice was the curve showing '4+ group size' in Figure 6-54. Detection probabilities for this case, along with those for 'excellent visibility' conditions (Figure 6-53) and 'all' data (Figure 6-52) were extracted to provide probabilities in 500 m increments (Table 6-27). To allow these probabilities to be applied to the management zones shown in Table 6-26, the average probability for each management zone was calculated and expected numbers and densities calculated for the three scenarios (Table 6-28).

The total expected number of blue whales is 158.6 for the '4+ group size' scenario, 437.9 for the 'excellent visibility' scenario and 530.7 for the 'all data' scenario. The total observed blue whales was 127.

The expected densities for each management zone for the three scenarios are shown in Figure 6-55. The data shows that for the '4+ group size' there is no significant difference in expected blue whale densities between any of the four management zones, with highest expected densities in the 0–500 m zone. The 'excellent visibility' and 'all data' scenarios show significant expected differences between

the 0 to 1,500 m and 1,501 to 3, 000 m management zones, however no significant differences between the 0–500 and 50 –1,500 m zones.

All the scenarios presented show similar expected densities for the 0 to 1,500 m zone. All three scenarios show that there is no increase in expected densities between the 0–500 and 501–1,500 m zones which implies that blue whales are not being displaced within 1,500 m. The '4+ group size' scenario (which most closely matches the Lead MFOs advice) implies that there is no displacement of blue whales within 3,000 m.

The '4+ group size' scenario has a mean expected density of 6.21 blue whales/km^2 across all zones, which (if correct) should apply to the wider area beyond observations. If whales are being displaced beyond 1,500 m as implied by the 'excellent visibility' and 'all data' scenarios, then the minimum mean expected densities for the wider area should be calculated using the observations between 1,501 and 3,000 m. These expected minimum mean densities are 18.70 blue whales/km^2 and 22.91 blue whales/km^2 for the 'excellent visibility' and 'all data' scenarios, respectively.

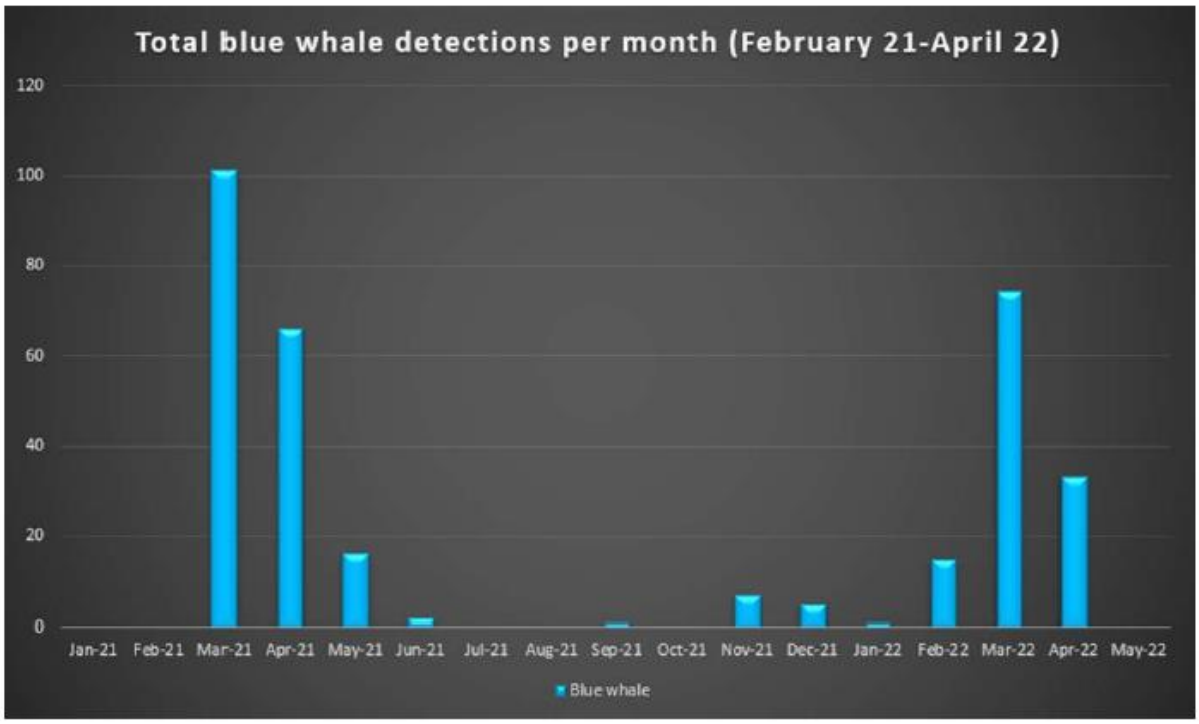


Figure 6-50: Blue Whale Sightings for the Otway Drilling Campaign

Table 6-26: Blue Whale Observations within 3,000 m of the MODU (2 February 2021 and 31 March 2022)

MODU activity	First detection – distance (m) from MODU					Total	Moving towards MODU	Moving away from MODU
	0-500	501-1,500	1,501-2,000	2,001-3,000	>3,000			
Drilling	-	7	3	8	7	**25**	13	12
Resupply	2	3	6	5	9	**25**	16	9
Drilling and Resupply	-	3	3	4	4	**14**	10	4
In Transit	-		1	5	2	**8**	4	4
At Standby	4	13	13	14	11	**55**	27	28
TOTAL	**6**	**26**	**26**	**36**	**33**	**127**	**70**	**57**

Observation area (km²)	0.76	6.31	5.50	15.70
Observed whales/km²	7.1	4.1	4.7	2.3

	0-1,500	1,501-3,000
TOTAL	32	62
Area (km²)	7.07	21.21
Blue whales/km²	7.8	2.9

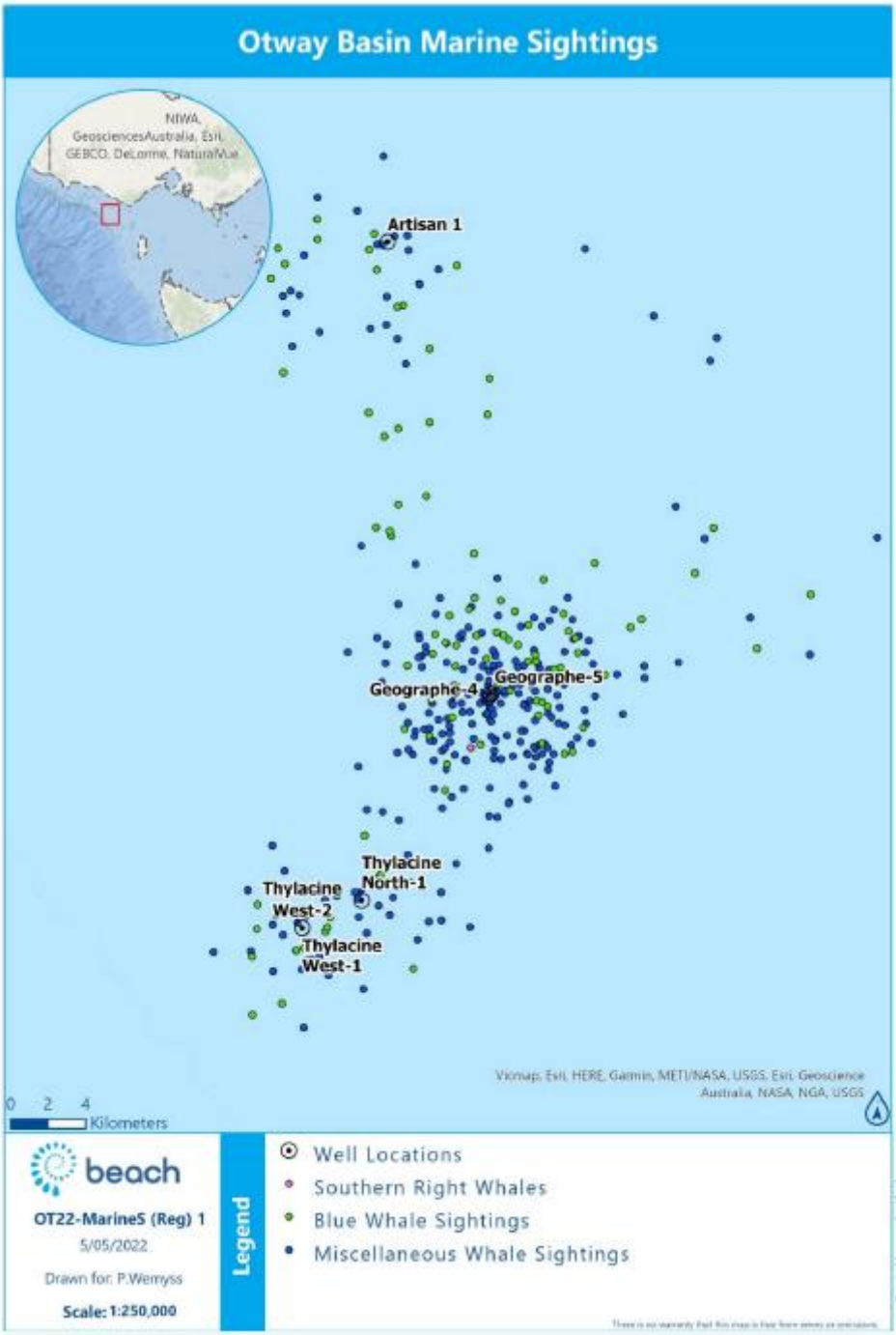


Figure 6-51: Whale Sightings between 2 February 21 – 31 March 2022

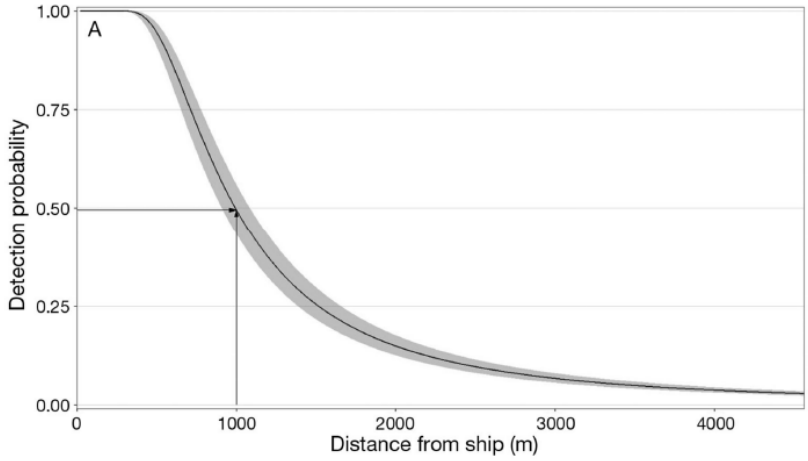


Figure 6-52: Detection Probability as it Varies with Distance between Ships and Whales in and near Glacier Bay National Park from 2008 to 2015 (Williams et al. 2016)

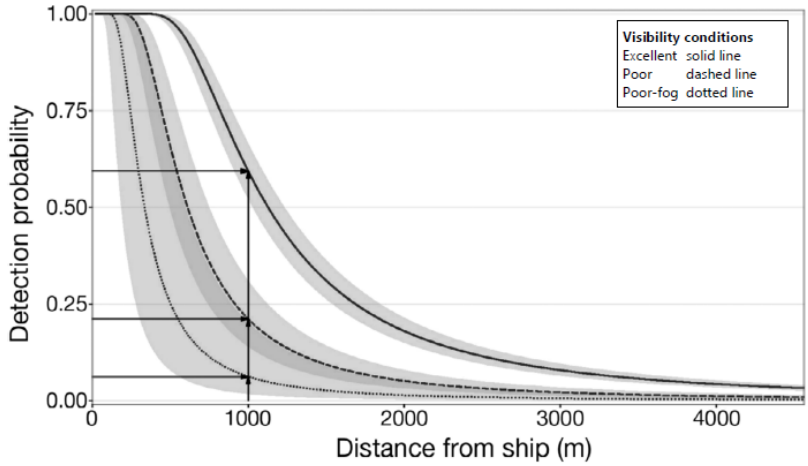


Figure 6-53: Detection Probability of Humpback Whales under Different Visibility Conditions (Williams et al. 2016)

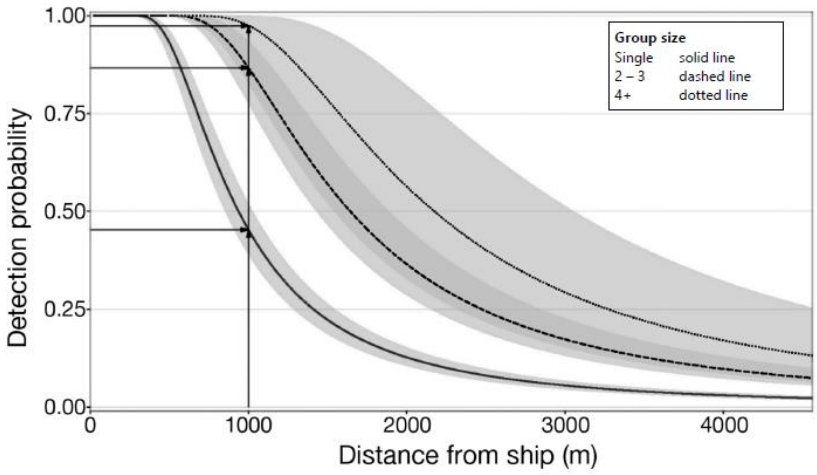


Figure 6-54: Probability of Detecting Whale Groups of Different Sizes of Humpback Whales (Williams et al. 2016)

Table 6-27: Detection Probabilities derived from Williams et al. (2016)

	Derived detection probabilities		
Distance	4+ group size	Excellent visibility	All data
0	1	1	1
500	1	0.98	0.94
1,000	0.97	0.59	0.5
1,500	0.78	0.31	0.25
2,000	0.57	0.18	0.15
2,500	0.4	0.12	0.09
3,000	0.29	0.08	0.07

Table 6-28: Estimated Blue Whale Abundance and Density based on MFO data from 2 Feb. 2021 and 31 Mar. 2022. Note that the reference to Table 5-22 is Table 6-26 in this EP.

	First detection – distance (m) from MODU			
	0-500	501-1,500	1,501-2,000	2,001-3,000
Area (km^2) (a)	0.76	6.31	5.50	15.70
From Table 5-22				
Observed numbers (b)	6	26	26	36
Blue whales/km^2	7.1	4.1	4.7	2.3
Mean detection probability (c)				
4+ group size	1.00	0.92	0.68	0.42
Excellent visibility	0.99	0.63	0.25	0.13
All data	0.97	0.56	0.20	0.10
Expected numbers (b ÷ c)				
4+ group size	6.0	28.4	38.5	85.7
Excellent visibility	6.1	41.5	106.1	284.2
All data	6.2	46.2	130.0	348.4
Expected density (whales/km^2) (b ÷ c ÷ a)				
4+ group size	7.89	4.50	7.00	5.46
Excellent visibility	7.97	6.58	19.29	18.10
All data	8.14	7.31	23.64	22.19

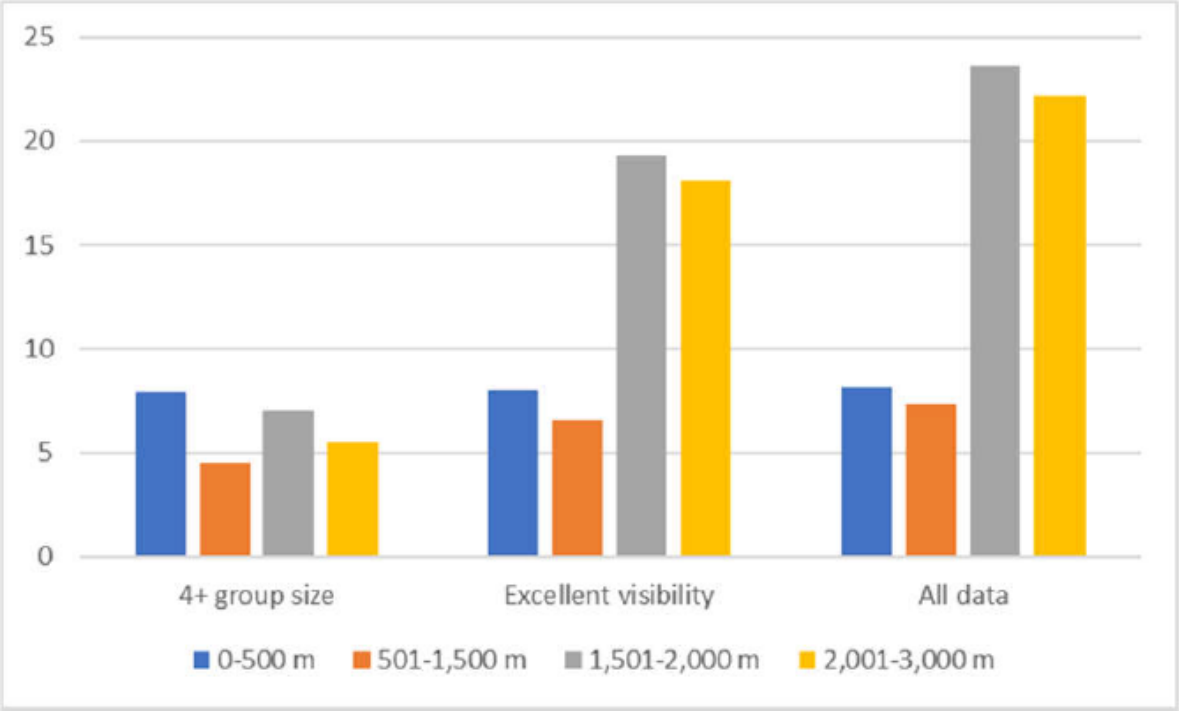


Figure 6-55: Expected Density (blue whales/km^2) for each Management Zone

Fin Whale

Fin whales are considered a cosmopolitan species and occur from polar to tropical waters and are rarely in inshore waters. They show well defined migratory movements between polar, temperate and tropical waters. Migratory movements are essentially north–south with little longitudinal dispersion. Fin whales regularly enter polar waters. Unlike blue whales and minke whales, fin whales are rarely seen close to ice, although recent sightings have occurred near the ice edge of Antarctica.

There are stranding records of this species from most Australian states, but they are considered rare in Australian waters (Bannister et al. 1996). The fin whale has been infrequently recorded between November and February during aerial surveys in the region (Gill et al. 2015). Fin whales have been sighted inshore in the proximity of the Bonney coast upwelling, Victoria, along the continental shelf in summer and autumn months (Gill 2002). Fin whales in the Bonney coast upwelling are sometimes seen in the vicinity of blue whales and sei whales.

Fin whales were sighted, and feeding was observed between November-May (upwelling season) during aerial surveys conducted between 2002-2013 in South Australia (Gill et al. 2015). This is one of the first documented records these whales feeding in Australian waters, suggesting that the region may be used for opportunistic baleen whale feeding (Gill et al. 2015). Fin whales have also been acoustically detected south of Portland, Victoria (Erbe et al. 2016). Aulich et al. (2019) recorded infrequent presence of fin whales in Portland between 2009 to 2016. This suggests that the area may not be a define migratory route however, calls recorded in July may be from whales migrating northward towards the east coast of NSW. Calls detected in late August and September may be indication of the presence of whales on their migration route back to Antarctica waters.

The sighting of a cow and calf in the Bonney coast upwelling in April 2000 and the stranding of two fin whale calves in South Australia suggest that this area may be important to the species' reproduction,

perhaps as a provisioning area for cows with calves (Morrice et al. 2004). However, there are no defined mating or calving areas in Australia waters.

As there are no BIAs for the fin whale in the Operational or Planning Areas, they are likely to be uncommon visitors.

Humpback Whale

Humpback whales (*Megaptera novaeangliae*) are present around the Australian coast in winter and spring. Humpbacks undertake an annual migration between the summer feeding grounds in Antarctica to their winter breeding and calving grounds in northern tropical waters. Along the south-east coast of Australia, the northern migration starts in April and May while the southern migration peaks around November and December (DAWE 2022a). A discrete population of humpback whales have been observed to migrate along the west coast of Tasmania and through Bass Strait, and these animals may pass through the Operational Area. The exact timing of the migration period varies between years in accordance with variations in water temperature, extent of sea ice, abundance of prey, and location of feeding grounds (DAWE 2022a). Feeding occurs where there is a high krill density, and during the migration this primarily occurs in Southern Ocean waters south of 55°S (DAWE 2022a).

Humpback whales satellite-tagged off Australia's east coast were tracked during three austral summers in 2008/2009, 2009/2010 and 2010/2011 (Andrews-Goff et al. 2018). Of the thirty tagged humpbacks, 21 migrated south along the coastline across into Bass Strait during October. In November the whales then migrated along the east coast (12 whales) and west coast (1 whale) of Tasmania to Antarctic feeding grounds. The state space model used shows both search and transit behaviour revealing new temperate feeding grounds in Bass Strait, the east coast of Tasmania and in the eastern Tasman Sea.

The nearest BIA to the Project which is important foraging habitat for migrating humpback whales is at Twofold Bay, a resting area off the NSW coast (DAWE 2021a). This BIA overlaps the northern extent of the Bass Planning Area (Figure 6-56). There are no known feeding, resting or calving grounds for humpback whales in the Operational Areas or Otway Planning Area, although feeding may occur opportunistically where sufficient krill density is present (CoA 2015a).

During Origin's Enterprise 3D seismic survey undertaken during early November 2014, 16 humpback whales were sighted (RPS 2014). During Beach's Otway Drilling Campaign in 2021/2022, which includes the Otway Operational Area, 95 humpback whale detections were made, with the highest numbers being during June, September, October and November.

The recovery of humpback whale populations following whaling has been rapid. The Australian east coast humpback whale population, which was hunted to near-extinction in the 1950s and early 1960s, had increased to 7,090±660 (95% CI) whales by 2004 with an annual rate of increase of 10.6±0.5% (95% CI) between 1987–2004 (Noad et al. 2011). The available estimates for the global population total more than 60,000 animals, and global population is categorised on the IUCN Red List as Least Concern.

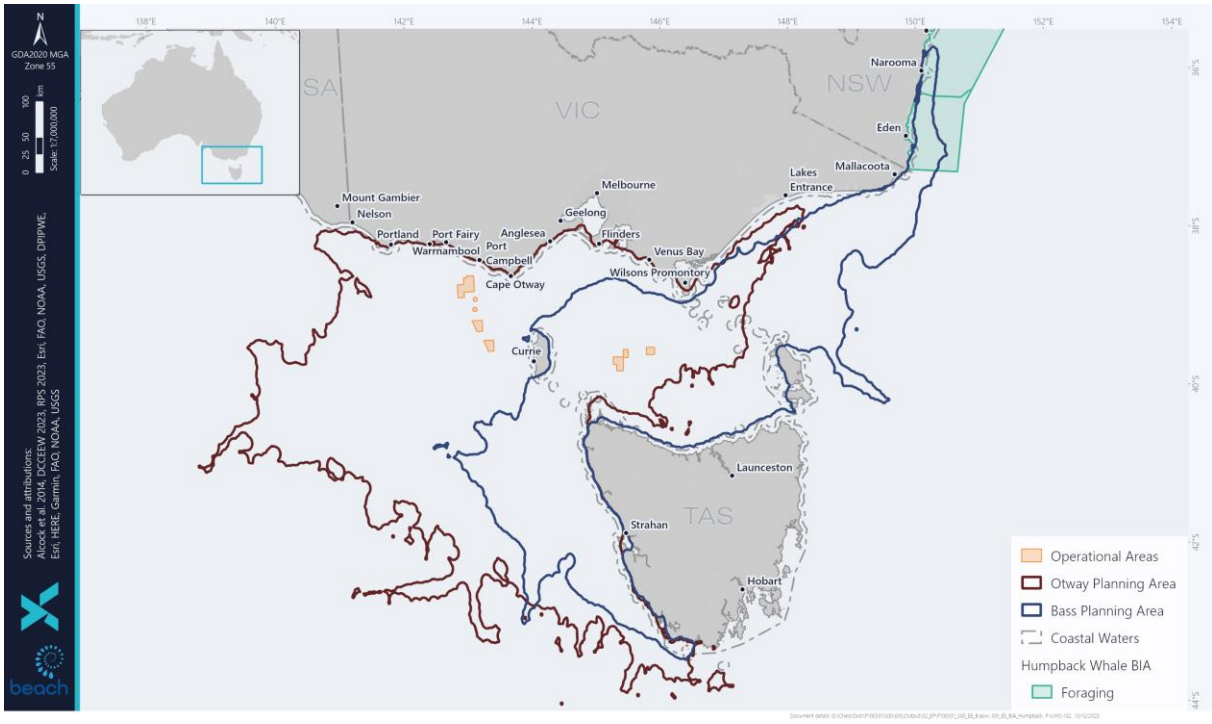


Figure 6-56: Humpback Whale BIAs within the Planning Areas

Killer Whale

Killer whales (*Orcinus orca*) are thought to be the most cosmopolitan of all cetaceans and appear to be more common in cold, deep waters; however, they have often been observed along the continental slope and shelf particularly near seal colonies (Bannister et al. 1996). The killer whale is widely distributed from polar to equatorial regions and has been recorded in all Australian waters with concentrations around Tasmania. The only recognised key locality in Australia is Macquarie Island and Heard Island in the Southern Ocean (Bannister et al. 1996). The habitat of killer whales includes oceanic, pelagic and neritic (relatively shallow waters over the continental shelf) regions, in both warm and cold waters (DoE 2024c).

Killer whales are top-level carnivores. Their diet varies seasonally and regionally. The specific diet of Australian killer whales is not known, but there are reports of attacks on dolphins, young humpback whales, blue whales, sperm whales, dugongs, and Australian sea lions (Bannister et al. 1996). In Victoria, sightings peak in June/July, where they have been observed feeding on sharks, sunfish, and Australian fur seals (Morrice et al. 2004; Mustoe 2008).

The breeding season is variable, and the species moves seasonally to areas of food supply (Bannister et al. 1996; Morrice et al. 2004). Killer whales are frequently present in Victorian waters with sightings recorded along most of Victoria's coastline. Mustoe (2008) describes between 2002 and 2008 web-based casual sightings had an average of 13 killer whales sighted per year in Victoria and NSW, more than half in Victorian waters. This combined with the Atlas of Victorian Wildlife indicates a peak in killer whale sightings in June to July and September to November (Mustoe 2008).

The killer whale has been observed within the region however there are no BIAs in the Operational or Planning Areas. One pod of killer whales were detected during Beach's Otway Drilling Campaign in 2021/2022, which includes the Otway Operational Area location. Therefore, it is likely that they would be uncommon visitors in the Operational or Planning Areas.

Long-finned Pilot Whale

The long-finned pilot whale (*Globicephala melas*) is distributed throughout the northern and southern hemispheres in circumpolar oceanic temperate and subantarctic waters containing zones of higher productivity along the continental slope. They sometimes venture into the shallower waters of the shelf (<200 m) in pursuit of prey species. Stomach contents confirm that squid are the main prey of longfinned pilot whales in Australian waters, although some fish are also taken (DoE 2023h). No key localities have been identified in Australia (Bannister et al. 1996) however they are considered reasonably abundant (DoE 2023h).

There is some (inconclusive) evidence that suggests the species moves along the edge of the continental shelf in southern Australian waters (Bannister et al. 1996) in response to prey abundance at bathymetric upper slopes and canyons (DoE 2023h). Records from Tasmania indicate mating occurs in spring and summer with 85% of calves born between September and March although births do occur throughout the year.

No calving areas are known in Australian waters (DoE 2023h).

The long-finned pilot whale has been identified in surveys over the Bass Strait and eastern Great Australian Bight; however, there are no BIAs in the Operational or Planning Areas. During works undertaken by Origin Energy, long-finned pilot whales have been seen sporadically, such as, a sighting of approximately 30 whales occurred during the 2014 Enterprise MSS. No longfinned pilot whales were detected during Beach's Otway Drilling Campaign in 2021/2022, which included the Otway Operational Area. It is likely that they would be uncommon visitors to the Operational or Planning Areas.

Minke Whale

The minke whale (*Balaenoptera acutorostrata*) is a widely distributed baleen whale that has been recorded in all Australian waters except the Northern Territory. The whales can be found inshore although they generally prefer deeper waters. In summer they are abundant feeding throughout the Antarctic south of 60°S but appear to migrate to tropical breeding grounds between 10°S and 20°S during the Southern Hemisphere winter (Kasamatru 1998; Reilly et al. 2008). Although the exact location of breeding grounds is unknown, mating occurs between August to September with calving between May and July (Bannister et al. 1996).

A few animals have been sighted during aerial surveys of the Bonney coast upwelling. The minke whale has been observed within the region, however, there are no BIAs in the Operational or Planning Areas. During Beach's Otway Drilling Campaign in 2021/2022, which included the Otway Operational Area, three minke whale detections were made during May. Therefore, it is likely that they would be uncommon visitors in the Operational or Planning Areas.

Pygmy Right Whale

The pygmy right whale (*Caperea marginata*) is a little-studied baleen whale species that is found in temperate and sub-Antarctic waters in oceanic and inshore locations. The species, which has never been hunted commercially, is thought to have a circumpolar distribution in the Southern Hemisphere between about 30°S and 55°S. Distribution appears limited by the surface water temperature as they are almost always found in waters with temperatures ranging from 5° to 20°C (Baker 1985) and staying north of the Antarctic Convergence. There are few confirmed sightings of pygmy right whales at sea

(Reilly et al. 2008). The largest reported group was sighted (100+) just south-west of Portland in June 2007 (Gill et al. 2008).

Species distribution in Australia is found close to coastal upwellings and further offshore it appears that the Subtropical Convergence may be important for regulating distribution (Bannister et al. 1996). Key locations include south-east Tasmania, Kangaroo Island (SA) and southern Eyre Peninsula (SA) close to upwelling habitats rich in marine life and zooplankton upon which it feeds (Bannister et al. 1996).

The pygmy right whale has been observed in surveys in the region, however, Origin Energy did not observe it during the 2010 Speculant MSS and 2014 Enterprise MSS. Also, there are no BIAs identified in the Operational or Planning Areas. No pygmy right whales were detected during Beach's Otway Drilling Campaign in 2021/2022, which includes the Otway Operational Area. Therefore, it is likely to be an uncommon visitor in the Operational and Planning Areas.

Sei Whale

Sei whales are considered a cosmopolitan species, ranging from polar to tropical waters, but tend to be found more offshore than other species of large whales. They show well defined migratory movements between polar, temperate and tropical waters. Migratory movements are essentially north-south with little longitudinal dispersion. Sei whales do not penetrate the polar waters as far as the blue, fin, humpback and minke whales (Horwood 1987), although they have been observed very close to the Antarctic continent.

Sei whales move between Australian waters and Antarctic feeding areas; subantarctic feeding areas (e.g. Subtropical Front); and tropical and subtropical breeding areas. The proportion of the global population in Australian waters is unknown as there are no estimates for sei whales in Australian waters.

Sei whales feed intensively between the Antarctic and subtropical convergences and mature animals may also feed in higher latitudes. Sei whales feed on planktonic crustaceans, in particular copepods and amphipods. Below the Antarctic convergence sei whales feed exclusively upon Antarctic krill (*Euphausia superba*).

In the Australian region, sei whales occur within Australian Antarctic Territory waters and Commonwealth waters, and have been infrequently recorded off Tasmania, NSW, Queensland, the Great Australian Bight, Northern Territory and Western Australia (Parker 1978; Bannister et al. 1996; Thiele et al. 2000; Chatto and Warneke 2000; Bannister 2008a).

Sightings of sei whales within Australian waters includes areas such as the Bonney coast upwelling off South Australia (Miller et al. 2012), where opportunistic feeding has been observed between November and May (Gill et al. 2015).

There are no known mating or calving areas in Australian waters. No sei whales were detected during Beach's Otway Drilling Campaign in 2021/2022, which includes the Otway Operational Area. Thus, the sei whale is likely to be an uncommon visitor to the Operational and Planning Areas.

Southern Right Whale

The southern right whale (*Eubalaena australis*) is listed as endangered under the EPBC Act in Australia and as endangered on the Victorian Threatened Species Advisory List.

The Draft National Recovery Plan for the Southern Right Whale (DCCEEW 2022a) provides an update to BIAs and emerging aggregation areas. The proposed changes are:

- Reproductive areas - Areas where mating, calving, nursing and/or presence of neonates are known, or likely, to occur. For Victoria this is the nearshore area between Portland and Port Campbell (Figure 6-57).
- Migration areas - Areas southern right whales are known, or likely, to use for movement between regions that support biologically important behaviour (e.g., coastal movement between reproductive areas) (Figure 6-57).

In addition, no 'Critical Habitat' as defined under section 207A of the EPBC Act have been identified, or included, in the Register of Critical Habitat.

The Operational Areas overlap the southern right whale migration BIA, and the Planning Areas overlap the southern right whale reproduction and migration BIAs (Figure 6-57).

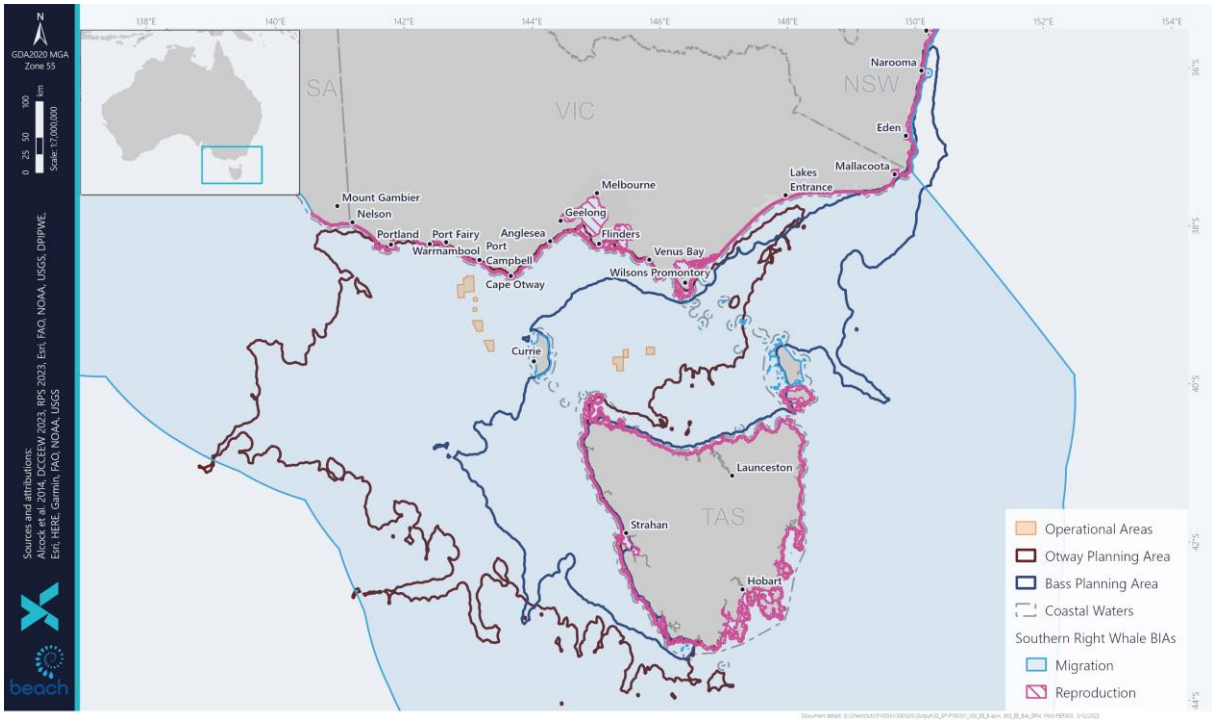


Figure 6-57: Southern Right Whale BIAs within the Planning Area

Population

Southern right whales were depleted to less than 300 individuals globally due to commercial whaling in the 19th and 20th centuries (Tormosov et al. 1998). They were protected from whaling in 1935 however, due to illegal whaling in the 1970s and because southern right whales have a slow rate of increase compared to other marine mammals, their numbers remain low (IWC 2013). Global abundance estimates are 13,000 for the species, across key wintering grounds in South Africa, Argentina, Australia, and New Zealand.

The Australian population of southern right whales is divided into two sub-populations due to genetic diversity (Carroll et al. 2011; Baker et al. 1999) and different rates of increase (DSEWPaC 2012a). The western sub-population occurs predominantly between Cape Leeuwin, Western Australia (WA) and

Ceduna, South Australia (SA) This sub-population comprises most of the Australian population and is estimated at 3,200 individuals increasing at an annual rate of approximately 6% p.a. (Smith et al. 2019). The eastern sub-population can be found along the south-eastern coast, including the region from Tasmania to Sydney, with key aggregation areas in Portland and Warrnambool in Victoria. The eastern sub-population is estimated at less than 300 individuals and is showing no signs of increase (Bannister, 2017). A rate of around 7% p.a. is considered the maximum biological rate of increase for southern right whales (IWC 2013). Connectivity between the two populations is unknown however, some limited movement between the two areas has been recorded (Burnell 2001, Charlton 2017, Pirzl et al. 2009).

Distribution

Southern right whales are distributed in the Southern Hemisphere with a circumpolar distribution between latitudes of 16°S and at least 65°S. They migrate from southern feeding grounds in sub-Antarctic waters to Australia in between May and November to calve, mate and rest (Bannister et al. 1996; DCCEEW 2022a). In Australian coastal waters, they occur along the southern coastline of the mainland and Tasmania and generally extend as far north as Sydney on the east coast and Perth on the west coast (DSEWPaC 2012a). There are occasional sightings further north, with the extremities of their range recorded at Hervey Bay and Exmouth (DSEWPaC 2012a).

The largest established calving areas in Australia include Head of Bight in SA, and Doubtful Island Bay and Israelite Bay in WA. Smaller but established aggregation areas regularly occupied by southern right whales include Yokinup Bay in WA, Fowlers Bay in SA and the Warrnambool and Portland in Victoria. Emerging aggregation areas include Flinders Bay, Hassell Beach, Cheyne/Wray Bays, and Twilight Cove in WA, and sporadically occupied areas include Encounter Bay in SA (DSEWPaC 2012a) Southern right whales generally occupy shallow sheltered bays within 2 km of shore and within water depths of less than 20 m (Charlton et al. 2019). A number of additional areas for southern right whales are emerging that might be of importance, particularly to the south-eastern population. In these areas, small but growing numbers of non-calving whales regularly aggregate for short periods of time. These areas include coastal waters off Peterborough, Port Campbell, Port Fairy, and Portland in Victoria (DSEWPaC 2012a).

There is variation in annual abundance on the coast of Australia due to the 3-year calving cycles (Charlton 2017). Female and calf pairs generally stay within the calving ground for 2–3 months (Burnell 2001). Peak periods for mating in Australian coastal waters are from mid-July through August (DSEWPaC 2012a). Pregnant females generally arrive during late May/early June and calving/nursery grounds are generally occupied until October (occasionally as early as April and as late as December) (Charlton et al. 2019). A study conducted by Stamation et al. (2020) shows that despite an increase in breeding females sighted in south-eastern Australian between 1985 and 2017, there is no evidence of an increase in annual numbers of mother-calf pairs.

As a highly mobile migratory species, southern right whales travel thousands of kilometres between habitats used for essential life functions. Movements along the Australian coast are reasonably well understood, but little is known of migration travel, non-coastal movements and offshore habitat use. Exactly where southern right whales approach and leave the Australian coast from, and to, offshore areas remain unknown (DSEWPaC 2012a). The Victorian and Tasmania coastal waters are known to include migrating habitat and SRW are known to arrive at the south eastern Australian coastline and travel west to established aggregation areas in South Australia such as the Head of the Great Australian Bight (Watson et al. 2021). There is one established calving ground for female and calf pairs in south-eastern Australian at Logans Beach, Warrnambool, Victoria (Watson et al. 2021). A

predominance of westward movements amongst long-range photo-identification re-sightings may indicate a seasonal westward movement in coastal habitat (Burnell 2001). Direct approaches and departures to the coast have also been recorded through satellite telemetry studies (Mackay et al. 2015).

Aerial surveys of western Bass Strait and eastern Great Australian Bight undertaken by Gill et al. (2015) detected southern right whales between May and September. A survey in early November 2010 did not observe any whales in the Warrnambool area and it was assumed that cows and calves had already left the calving and aggregation areas (M. Watson pers. comm. 2010). No southern right whales were encountered during Origin's Enterprise 3D seismic survey undertaken during November 2014 (RPS 2014), or during spotter flights of the coastline undertaken prior to the survey in late October 2014. Aerial surveys between Ceduna, SA and Sydney NSW (and included Tasmania) were undertaken in August of 2013 and 2014 and recorded a total of 34 southern right whale individuals (17 breeding females) in 2013 and 39 (11 breeding females) in 2014, respectively (Watson et al. 2015).

Marine mammal observer data from January 2021 to April 2022 for the drilling program in the Otway Development Area identified three southern right whales (Table 6-25) consisting of a single individual in each month of June, July and August.

The Conservation Management Plan for the Southern Right Whale (DSEWPaC 2012a) reports that known and potential threats that may have individual or population level impacts to southern right whales include entanglement in fishing gear, vessel disturbance, climate variability and change, noise interference, habitat modification and overharvesting of prey.

Cultural significance

The Draft National Recovery Plan for the Southern Right Whale (DCCEEW 2022a) provides information on the cultural significance of southern right whales to Indigenous Australians. The plan details:

- At the Great Australian Bight in South Australia, the Mirning people are whale people, and the white whale Jeedara is their totem and part of the Dreaming, which tells how the Mirning and Southern Right Whales are connected (Burgoyne 2000).
- In Victoria, *Koontapool* (southern right whales) occur along the coastlines of south-west Victoria in Gunditjmara Sea Country to feed and birth. These *Koontapool Woorrkngan Yakeen* (Whale Birthing Dreaming Sites), are in coastal bay areas from Port Campbell to Portland, including Warrnambool. These places on Gunditjmara Country are known resting and feeding sites for mothers and calves and are directly related to Gunditjmara Neeyn (midwives), explaining why Gunditjmara is a Matrilineal Nation.

Further information on the cultural significance of whales is provided in 6.6.3.4.

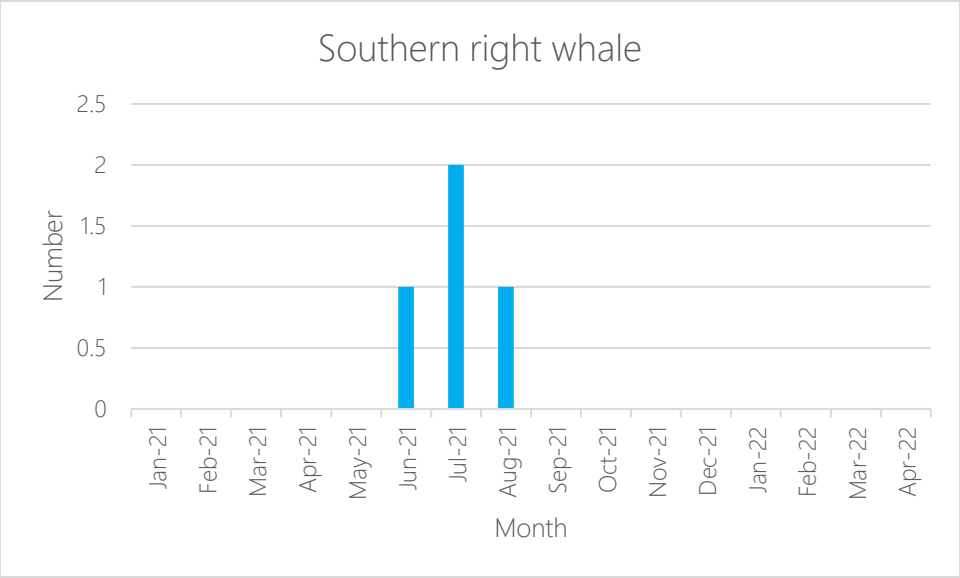


Figure 6-58: Southern Right Whale Sightings for the Otway Drilling Campaign

Sperm Whale

The sperm whale (*Physeter macrocephalus*) has a worldwide distribution and has been recorded in all Australian states. Sperm whales tend to inhabit offshore areas with a water depth of 600 m or greater and are uncommon in waters less than 300 m deep (DoE 2024e). Key locations for the species include the area between Cape Leeuwin to Esperance (WA); southwest of Kangaroo Island (SA), deep waters of the Tasmanian west and south coasts, areas off southern NSW (e.g., Wollongong) and Stradbroke Island (Qld) (DoE 2024e). Concentrations of sperm whales are generally found where seabeds rise steeply from a great depth (i.e., submarine canyons at the edge of the continental shelf) associated with concentrations of food such as cephalopods (DoE 2024e).

Females and young males are restricted to warmer waters (i.e., north of 45°S) and are likely to be resident in tropical and sub-tropical waters year-round. Adult males are found in colder waters and to the edge of the Antarctic pack ice. In southern Western Australian waters sperm whales move westward during the year. For species in oceanic waters, there is a more generalised movement of sperm whales' southwards in summer and northwards in winter (DoE 2024e).

Sperm whales are prolonged and deep divers often diving for over 60 minutes (Bannister et al. 1996) however studies have observed sperm whales do rest at, or just below, surface for extended periods (>1 hour) (Gannier et al. 2002). In addition, female and juvenile sperm whales in temperate waters have been observed to spend several hours a day at surface resting or socialising (Hastie et al. 2003).

The sperm whale has been observed in the region, however the closest recognised BIA for foraging is further east near Kangaroo Island in South Australia. Therefore, it is likely they would be uncommon visitors in the Operational or Planning Areas.

Bottlenose Dolphin

The bottlenose dolphin (*Tursiops truncates*) has a worldwide distribution from tropical to temperate waters. While the species is primarily coastal, they are also found inshore, on the shelf and open oceans.

They are associated with many types of substrate and habitats, including mud, sand, seagrasses, mangroves and reefs (DoE 2024hj). Bottlenose dolphins are known to associate with several cetacean species such as pilot whales, white-sided, spotted, rough-toothed and Risso's dolphins, and humpback and right whales (DoE 2024h).

There are two forms of bottlenose dolphin, a nearshore form, and an offshore form. The nearshore form occurs in Southern Australia including the Otway Basin area, while the offshore form is found north of Perth and Port Macquarie in NSW. Most populations are relatively discrete and reside in particular areas, such as individual resident populations in Port Phillip Bay, Westernport Bay, Spencer Gulf, Jervis Bay, and Moreton Bay. There may be some migration and exchange between the populations, but it is likely that most encountered near the Victorian coasts are local residents.

During Beach's Otway Drilling Campaign in 2021/2022, which included the Otway Operational Area, 40 bottlenose dolphin detections were made, spread across the year. However, no BIAs for this species have been identified in the Operational or Planning Areas.

Common Dolphin

The common dolphin (*Delphinus delphis*) is an abundant species, widely distributed from tropical to cool temperate waters, and generally further offshore than the bottlenose dolphin, although small groups may venture close to the coast and enter bays and inlets. They have been recorded in waters off all Australian states and territories. Stranding statistics indicate that common dolphins are active in Bass Strait at all times of the year, though less so in winter (DoE 2024i).

Common dolphins are usually found in areas where surface water temperatures are between 10°C and 20°C, and in habitats also inhabited by small epipelagic fishes such as anchovies and sardines.

In many areas around the world common dolphins show shifts in distribution and abundance, suggesting seasonal migration. The reason for this seasonal migration is unknown however in New Zealand the shift appears to be correlated with sea surface temperature and in South Africa, the species occurrence appears to be correlated with the annual sardine run (DoE 2024i). They are abundant in the Bonney coast upwelling during the upwelling season, and very scarce outside the season.

Dusky Dolphin

The dusky dolphin (*Lagenorhynchus obscures*) is rare in Australian waters and has been primarily reported across southern Australia from Western Australia to Tasmania with a handful of confirmed sightings near Kangaroo Island and off Tasmania (DoE 2024gi). Only 13 reports of the dusky dolphin have been made in Australia since 1828, and key locations are yet to be identified (Bannister et al. 1996). The species is primarily found from approximately 55°S to 26°S, though sometimes further north associated with cold currents. They are considered to be primarily an inshore species but can also be oceanic when cold currents are present (DoE 2024g).

No dusky dolphins were detected during Beach's Otway Drilling Campaign in 2021/2022, which included the Otway Operational Area.

Indian Ocean Bottlenose Dolphin

The Indian Ocean bottlenose dolphins are found in tropical and sub-tropical coastal and shallow offshore waters of the Indian Ocean, Indo-Pacific Region and the western Pacific Ocean bottlenose dolphins are distributed continuously around the Australian mainland, but the taxonomic status of

many populations is unknown. Indian Ocean bottlenose dolphins have been confirmed to occur in estuarine and coastal waters of eastern, western and northern Australia and it has also been suggested that the species occurs in southern Australia (Kemper 2004).

In south-eastern Australia, inshore Indian Ocean bottlenose dolphins show a high degree of site fidelity to some local areas and appear to belong to relatively small communities or populations (Möller et al. 2002). A breeding BIA for the Indian Ocean bottlenose dolphin overlaps the northern extent of the Bass Planning Area in the coastal waters of NSW (Figure 6-59). No Indian Ocean bottlenose dolphins were detected during Beach's Otway Drilling Campaign in 2021/2022, which included the Otway Operational Area.

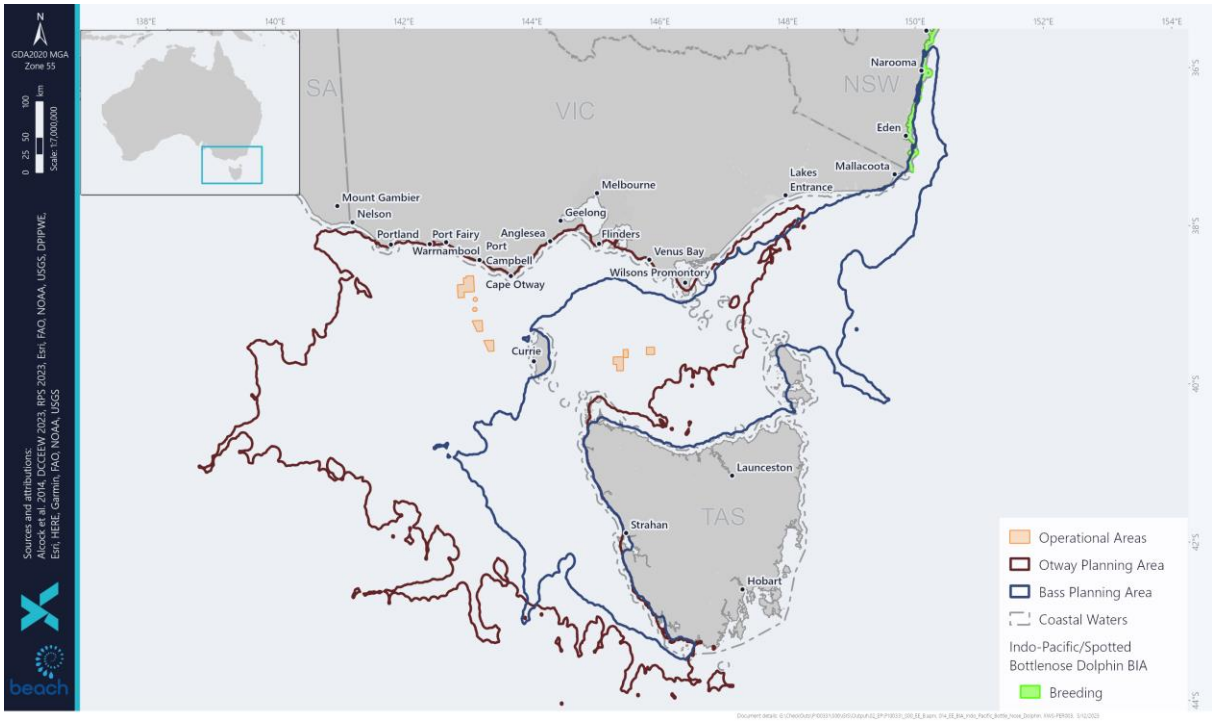


Figure 6-59: Indian Ocean Bottlenose Dolphin BIAs within the Planning Areas

Risso's Dolphin

The Risso's dolphin (*Grampus griseus*) is a widely distributed species found in deep waters of the continental slop and outer shelf from the tropics to temperate regions. The species prefer warm temperate to tropical waters with depths greater than 1,000 m, although they do sometimes extend their range into cooler latitudes in summer (Bannister et al. 1996). They are thought to feed on cephalopods, molluscs and fish.

Risso's dolphin has been observed in the region, however no BIAs have been identified in the Operational or Planning Areas. No Risso's dolphins were detected during Beach's Otway Drilling Campaign in 2021/2022, which included the Otway Operational Area. Therefore, it is likely they would be uncommon visitors in the Operational and Planning Areas.

Southern Right Whale Dolphin

The southern right whale dolphin (*Lissodelphis peronnii*) is a pelagic species found in Southern Australian waters but generally well offshore in deep water or on the outer edges of the continental shelf between the subtropical and subantarctic convergence (DoE 2024f). No key localities have been

identified in Australian waters however preferred water temperatures range from approximately 2-20°C (DoE 2024f). Of the limited southern right whale dolphin stomachs examined, myctophids and other mesopelagic fish, squid and crustaceans have been recorded, and euphausiids are also thought to be potential prey (DoE 2024f). It is unknown whether the southern right whale dolphin is a surface or deep-layer feeder (Bannister et al. 1996).

Calving areas are not known, however there is evidence that the calving season occurs between November to April (DoE 2024f).

The southern right whale dolphin has been observed in the region; however, no BIAs have been identified in the Operational or Planning Areas. No southern right whale dolphins were detected during Beach's Otway Drilling Campaign in 2021/2022, which included the Otway Operational Area. Therefore, it is likely they would be uncommon visitors in the Operational and Planning Areas.

6.4.7.7 Pinnipeds

The PMST reports identified four pinniped species that are known to or may occur within the Operational or Planning Areas including breeding known to occur for the Australian fur-seal (Table 6-29) (Appendix E). The Operational and Planning Areas do not overlap any BIAs for pinnipeds.

The Gunditjmara people have identified seals as a species of cultural importance, traditionally collected by women along the Gunditjmara coast (GMTOAC 2023). See Section 6.6.3.2 for further information.

Table 6-29: Listed Pinniped Species identified in the PMST Reports

Common Name	Scientific Name	EPBC Status			Operational Area		Planning Area	
		Listed Threatened	Listed Migratory	Listed Marine	Bass	Otway	Bass	Otway
Australian Fur-seal, Australo-African Fur-seal	*Arctocephalus pusillus*	-	-	Listed	Species or species habitat may occur within area	Species or species habitat may occur within area	Breeding known to occur within area	Breeding known to occur within area
Australian Sea-lion, Australian Sea Lion	*Neophoca cinerea*	Endangered	-	Listed	-	-	-	Species or species habitat may occur within area
		Conservation Listing Advice for the *Neophoca cinerea* (Australian sea lion) (TSSC 2020). Recovery Plan for the *Neophoca cinerea* (Australian sea lion) (DSEWPaC 2013b).						
Long-nosed Fur-seal, New Zealand Fur-seal	*Arctocephalus forsteri*	-	-	Listed	Species or species habitat may occur within area	Species or species habitat may occur within area	Breeding known to occur within area	Breeding known to occur within area
Southern Elephant Seal	*Mirounga leonina*	Vulnerable	-	Listed	-	-	Breeding may occur within area	Breeding may occur within area

Australian Fur-seal

Australian fur-seals (*A. pusillus*) breed on islands of the Bass Strait but range throughout waters off the coasts of South Australia, Tasmania, Victoria, and NSW. Numbers of this species are believed to be increasing as the population recovers from historic hunting (Hofmeyr et al. 2008). The species is endemic to south-eastern Australian waters.

In Victorian State waters they breed on offshore islands, including Lady Julia Percy Island, Seal Rocks in Western Port Bay, Kanowna and Rag Islands off the coast of Wilson's Promontory and The Skerries off Wingan Inlet in Gippsland (Figure 6-60). There are important breeding sites on Lady Julia Percy Island and Seal Rocks, with 25% of the population occurring at each of these islands. Their preferred breeding habitat is a rocky island with boulder or pebble beaches and gradually sloping rocky ledges.

Haul out sites with occasional pup births are located at Cape Bridgewater, at Moonlight Head, on various small islands off Wilsons Promontory and Marengo Reef near Apollo Bay. Australian fur-seals are present in the region all year, with breeding taking place during November and December.

Research being undertaken at Lady Julia Percy Island indicates that adult females feed extensively in the waters between Portland and Cape Otway, out to the 200 m bathymetric contour. Seal numbers on the island reach a maximum during the breeding season in late October to late December. By early December, large numbers of lactating females are leaving for short feeding trips at sea and in late December there is an exodus of adult males. Thereafter, lactating females continue to alternate between feeding trips at sea and periods ashore to suckle their pups. Even after pups begin to venture to sea, the island remains a focus, and at any time during the year groups may be seen ashore resting (Robinson et al. 2008; Hume et al. 2004; Arnould & Kirkwood 2007).

During the summer months, Australian fur-seals travel between northern Bass Strait islands and southern Tasmania waters following the Tasmanian east coast, however, lactating female fur-seals and some territorial males are restricted to foraging ranges within Bass Strait waters. Lactating female Australian fur-seals forage primarily within the shallow continental shelf of Bass Strait and Otway on the benthos at depths of between 60–80 m and generally within 100–200 km of the breeding colony for up to five days at a time.

Male Australian fur-seals are bound to colonies during the breeding season from late October to late December, and outside of this they time forage further afield (up to several hundred kilometres) and are away for long periods, even up to nine days (Kirkwood et al. 2009; Hume et al. 2004).

As there are breeding and haul out sites within the Planning Areas it is likely that Australian fur-seals would be present in the Planning Areas. During Beach's Otway Drilling Campaign in 2021/2022, which included the Otway Operational Area, 394 Australian fur-seal detections were made, spread across the year.

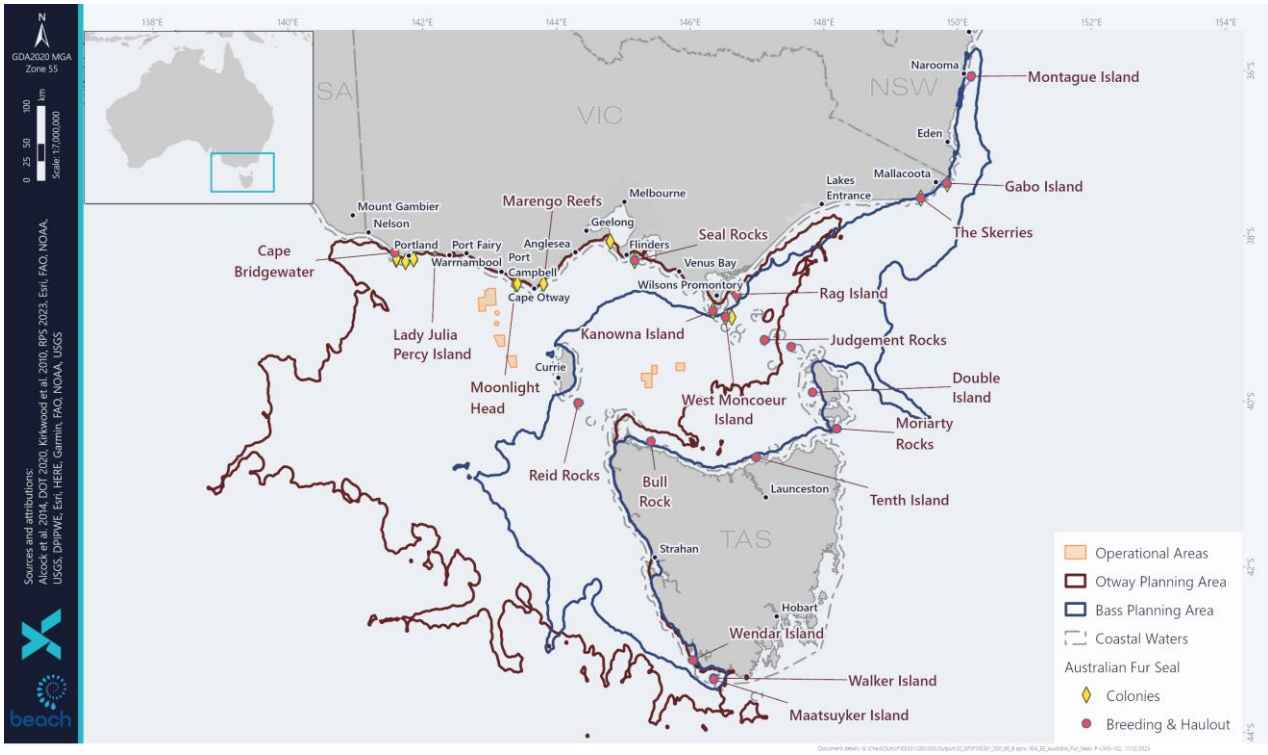


Figure 6-60: Locations of Australian Fur-seal Breeding Colonies and Haul Out Sites (Kirkwood et al. 2010)

Australian Sea Lion

The Australian sea lion is the only endemic, and least abundant, pinniped that breeds in Australia (DSEWPC 2013b). All current breeding populations are outside of the Planning Area and are located from the Abrolhos Islands (Western Australia) to the Pages Islands (South Australia). The Australian sea lion uses a variety of shoreline types but prefer the more sheltered side of islands and typically avoid rocky exposed coasts (Shaughnessy 1999).

The Australian sea lion is a specialised benthic forager, i.e. it feeds primarily on the sea floor (DSEWPaC 2013). The Australian sea lion feeds on the continental shelf, most commonly in depths of 20–100 m, with adult males foraging further and into deeper waters (DSEWPaC 2013b). They typically feed on a range of prey including fish, cephalopods (squid, cuttlefish and octopus), sharks, rays, rock lobster and penguins (DSEWPC 2013b) They typically forage up to 60 km from their colony but can travel up to 190 km when over shelf waters (Shaughnessy 1999).

New Zealand Fur-seal

New Zealand fur-seal (*Arctocephalus forsteri*) are found in the coastal waters and offshore islands of South and Western Australia, Victoria, NSW and New Zealand. Population studies for New Zealand fur-seal in Australia carried out in 1990 estimated an increasing population of about 35,000. The species breeds in southern Australia at the Pages Islands and Kangaroo Island, which produces about 75% of the total pups in Australia. Small populations are established in Victorian coastal waters including at Cape Bridgewater near Portland, Lady Julia Percy Island near Port Fairy and, Kanowna Island (near Wilsons Promontory) and The Skerries in eastern Victoria.

Figure 6-61 displays the known breeding colonies of New Zealand fur-seal (Kirkwood et al. 2009). These colonies are typically found in rocky habitat with jumbled boulders. Colonies are typically

occupied year-round, with greater activity during breeding seasons. Pups are born from mid-November to January, with most pups born in December (Goldsworthy 2008). Known sites for New Zealand fur-seal breeding colonies within the Planning Areas include Kanowna Island, Kent Group, Lady Julia Percy Island, Maatsuyker Island, Seal Rocks and The Skerries (Figure 6-61).

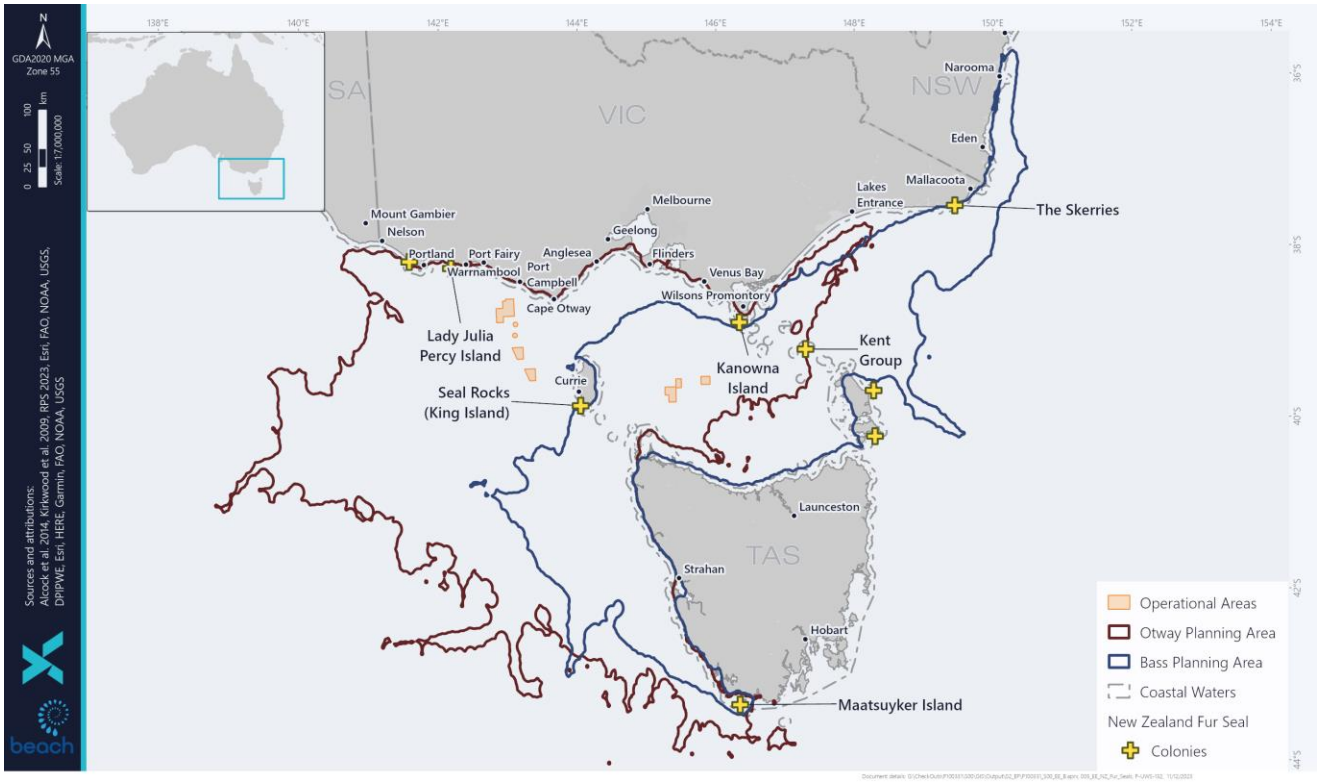


Figure 6-61: Locations of New Zealand Fur-seal Colonies (Kirkwood et al. 2009).

6.4.7.8 Pest Species

Invasive marine species (IMS) are marine plants or animals that have been introduced into a region beyond their natural range and have the ability to survive, reproduce and establish. More than 200 non-indigenous marine species including fish, molluscs, worms, and a toxic alga have been detected in Australian coastal waters.

It is widely recognised that IMS can become pests and cause significant impacts on economic, ecological, social and cultural values of marine environments. Impacts can include the introduction of new diseases, altering ecosystem processes and reducing biodiversity, causing major economic loss, and disrupting human activities (Brusati and Grosholz 2006).

In the South-east Marine Region, 115 marine pest species have been introduced and an additional 84 have been identified as possible introductions, or 'cryptogenic' species (NOO 2002a). Several introduced species have become pests either by displacing native species, dominating habitats, or causing algal blooms.

Invasive marine species known to occur were identified from 'www.marinepests.gov.au' (DAFF 2024) in ports where the rig and support vessels may mobilise from are detailed in Table 6-30.

Table 6-30: Marine Pests Known to Occur in Ports relevant to the Drilling Program

Marine Pest	Description	Portland	Melbourne
Asian date mussel (*Musculista senhousia*)	Prefers soft sediments in waters up to 20 m deep, forming mats and altering food availability for marine fauna.	✓	✓
Asian shore crab (*Hemigrapsus sanguineus*)	Established in Victoria. Asian shore crabs were detected in Port Phillip Bay in 2020. Generally found hard substrates in intertidal areas, under rocks, shells, debris, or artificial structures. Likely habitats include burrowed up to 30cm deep, hard, and soft surfaces, shallow waters, up to 30m deep.		✓
European fan worms (*Sabella spallanzanii*)	Can form dense colonies and consume vast amounts of food to the detriment of native species. It fouls infrastructure and can increase operating costs for industry. Likely habitats include burrowed up to 30cm deep, hard, and soft surfaces, shallow waters, up to 30m deep.	✓	✓
European shore crab (*Carcinus maenas*)	Prefers intertidal areas, bays, estuaries, mudflats, and subtidal seagrass beds, but occurs in waters up to 60 m deep. It is widespread across Victorian intertidal reef and common in Western Port.		✓
Japanese kelp (*Undaria pinnatifida*)	Occupies cold temperate oceanic waters up to 20 m deep, growing on rock, reef, stones, and artificial structures. It rapidly forms dense forests and overgrows native species. It first established in Port Phillip Bay in the 1980s (Parks Victoria, 2020).		✓
Northern pacific seastar (*Asterias amurensis*)	Prefer soft sediment habitat, but also use artificial structures and rocky reefs, living in water depths usually less than 25 m (but up to 200 m water depths). It is thought to have been introduced through ballast water from Japan.		✓

6.5 Socio-Economic Environment

This section describes the socio-economic environment within the Operational and Planning Areas.

6.5.1 Coastal Settlements

There are no coastal settlements or Local Government Areas (LGAs) within the Operational Areas. LGAs overlapping the Planning Areas are presented below in Table 6-31 and Figure 6-62. Larger settlements within the Planning Areas are described below based on ABS (2021) census data, separated by state.

Table 6-31: LGAs within the Planning Areas

Local Government Area	State	Planning Area	
		Bass	Otway
Bass Coast	Vic	-	✓
Bega Valley	NSW	✓	-
Circular Head	Tas	✓	✓
Colac Otway	Vic	-	✓
Corangamite	Vic	-	✓
East Gippsland	Vic	✓	-
Eurobodalla	NSW	✓	-
Flinders	Tas	✓	✓
Glenelg	Vic	-	✓
Greater Geelong	Vic	-	✓
Huon Valley	Tas	✓	✓
King Island	Tas	✓	✓
Mornington Peninsula	Vic	-	✓
Moyne	Vic	-	✓
Queenscliffe	Vic	-	✓
South Gippsland	Vic	-	✓
Surf Coast	Vic	-	✓
Unincorporated Vic	Vic	✓	✓
Warrnambool	Vic	-	✓
Wellington	Vic	-	✓

West Coast	Tas	✓	✓

The larger New South Wales coastal settlements within the Planning Areas are described below based on ABS (2021) census data:

- Narooma has a population of 2,731 and a median age of 58. Of those in the labour force, 41.5% work full-time and 44.6% work part-time. Technicians/trades workers, community/personal service workers and managers comprise 45.7% of occupations.
- Tathra has a population of 1,527 and a median age of 56. Of those in the labour force, 53.1% work full-time and 37.6% work part-time. Professionals, managers and technicians/trades workers comprise 57.5% of occupations.

The larger Tasmanian coastal settlements within the Planning Areas are described below based on ABS (2021) census data:

- Currie (King Island) has a population of 659 and a median age of 49. Of those in the labour force, 63.0% work full-time and 33.3% work part-time. Dairy and beef cattle farming comprise 34.6% of occupations.
- Stanley has a population of 595 and a median age of 51. Of those in the labour force, 53.1% work full-time and 33.8% work part-time. Managers, labourers, professionals, and technicians/trades workers comprise 64.3% of occupations.
- Strahan has a population of 697 and a median age of 40. Of those in the labour force, 48.7% work full-time and 38% work part-time. Labourers, managers, technicians/trades workers and community/personal service workers comprise 63.1% of occupations. Accommodation is the largest industry of employment, employing 17.1% of the workforce.

The larger Victorian coastal settlements within the Planning Areas are described below based on ABS (2021) census data:

- Apollo Bay has a population of 1,790 people and a median age of 52. Of those in the labour force, 40.05% work full-time and 44.2% work part-time. Labourers and mangers are the highest occupation making up 33.9% of the workforce. Accommodation and supermarket and grocery stores are the biggest industries, making up 21.1% of employment.
- Phillip Island has a population of 13,799 and a median age of 52. Of those in the labour force, 45.1% work full-time and 40.4% work part-time. Professionals, managers, technicians and trades make up 50.3% of occupations with the accommodation, retail, restaurants, hospitals and education the main employers.
- Warrnambool has a population of 35,406 and a median age of 42. Of those in the labour force, 53.3% work full-time and 36.6% work part-time. Hospitals employ 6.6% of the workforce followed by cheese and other dairy product manufacturing, aged care residential services, other social assistance services and supermarket and grocery stores. Professionals, technicians and trade workers and labourers comprise 47.7% of occupations.

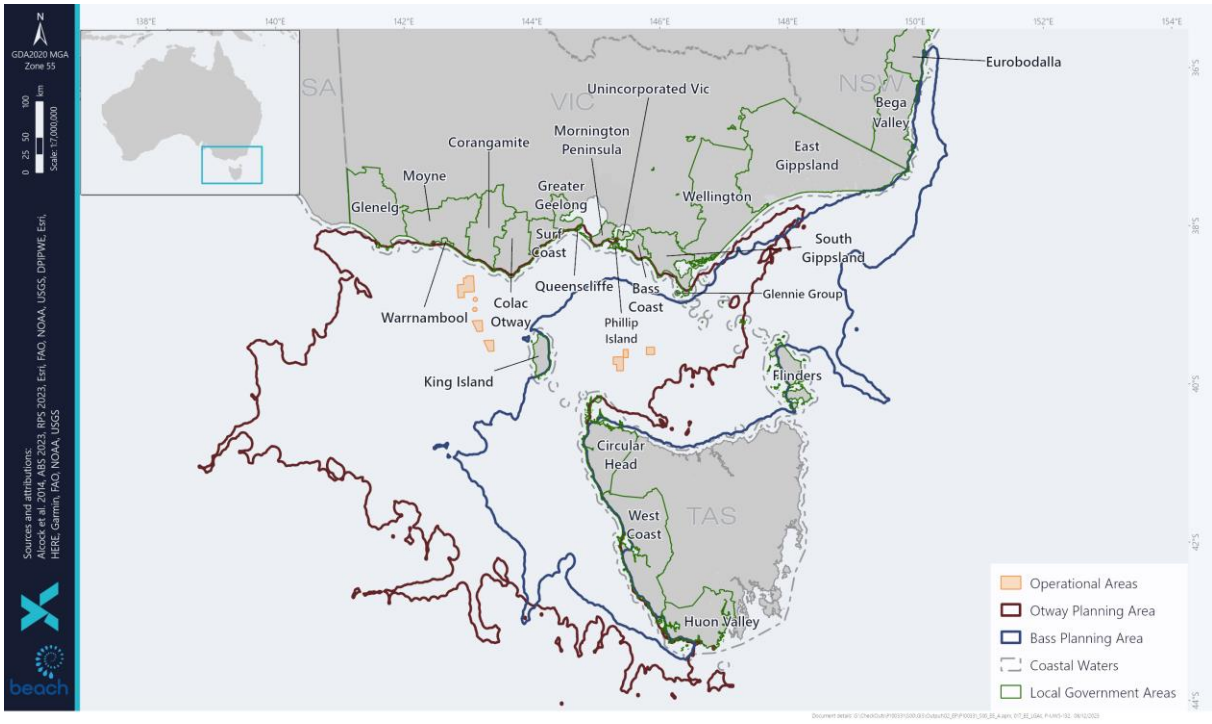


Figure 6-62: Local Government Areas within the Planning Areas

6.5.2 Offshore Petroleum Industry

Petroleum exploration has been undertaken within the Otway Basin since the early 1960s. Gas reserves of approximately 2 trillion cubic feet (tcf) have been discovered in the offshore Otway Basin since 1995, with production from five gas fields using 700 km of offshore and onshore pipeline. Up to 2015, the DEDJTR reports that 23 PJ of liquid hydrocarbons (primarily condensate) has been produced from its onshore and offshore basins, with 65 PJ remaining, while 85 PJ of gas has been produced (Victoria and South Australia), with 1,292 PJ remaining. Otway Operational Area overlaps the ConocoPhillips Australia exploration titles (VIC/P79 and T/49P) and is adjacent to the Cooper Energy Casino and Henry gas fields, Casino-Henry pipeline and Minerva gas field and pipeline. There is no non-Beach oil and gas infrastructure within the Bass Operational Area.

The Cooper Energy Casino and Henry gas fields and Casino-Henry pipeline, Minerva gas field and pipeline, Tasmanian Gas pipeline and ConocoPhillips Australia exploration titles are within the Otway Planning Area. The most north-eastern extent of the Otway Planning Area also overlaps Esso Australia infrastructure within the Gippsland Basin including Barracouta, Dolphin, Perch, Snapper and Whiting.

The Bass Planning Area overlaps the Tasmanian Gas pipeline and Pelican gas field in the Bass Strait. Within the Gippsland Basin, the Bass Planning Area overlaps the Liberty Petroleum exploration titles (VIC/P77 and VIC/P78) as well as existing Esso Australia infrastructure including Bream, Cobia, Flounder, Fortescue, Halibut, Kingfish, Mackerel, Marlin, Tuna, West Kingfish and West Tuna.

6.5.3 Other Infrastructure

The Victorian Desalination Plant, located at Wonthaggi, is located 134 km north of the Bass Operational Area and adjacent to the Otway Planning Area. Operation of the plant commenced in December 2012. The seawater intake and outlet structures are connected to the onshore plant via a 1.2 km and 1.5 km underground tunnel, respectively. The two intake structures are 8 m high, 13 m in

diameter, situated 50 m apart and located in a water depth of 20 m. They draw in water at very low speeds (the suction effect is not strong enough to draw fish in).

The Superloop Indigo Central telecommunications cable, which connects Perth and Sydney through southern Australia, intersects the Otway Operational Area. There are two Telstra telecommunications cables located in central Bass Strait, Bass Strait-1, and Bass Strait-2, which are located approximately 1 km and 6 km, respectively, from the Bass Operational Area. The Basslink submarine cable is located 88 km east of the Bass Operational Area within the Bass Planning Area. Figure 6-63 details the location of these cables.

Four new cables are planned to be installed in the next 5 years that are within the Planning Areas (Figure 6-63):

- East Coast Cable System between Melbourne, Sydney and Brisbane is being developed by Vocus.
- Hawaiki Nui – Hawaiki Submarine Cable between Melbourne and Sydney being developed by BW Digital.
- Marinus Link undersea electricity and data cable that will connect Tasmania and Victoria. Construction is likely to commence in early 2025.
- Sydney-Melbourne-Adelaide-Perth (SMAP) Cable being developed by SUBCO. Stakeholder (Stakeholder ID: 25165860) confirmed the proposed cable is outside of the Bass Operational Area.

No spatial data is available yet for the East Coast Cable System or Hawaiki Nui – Hawaiki Submarine Cable.

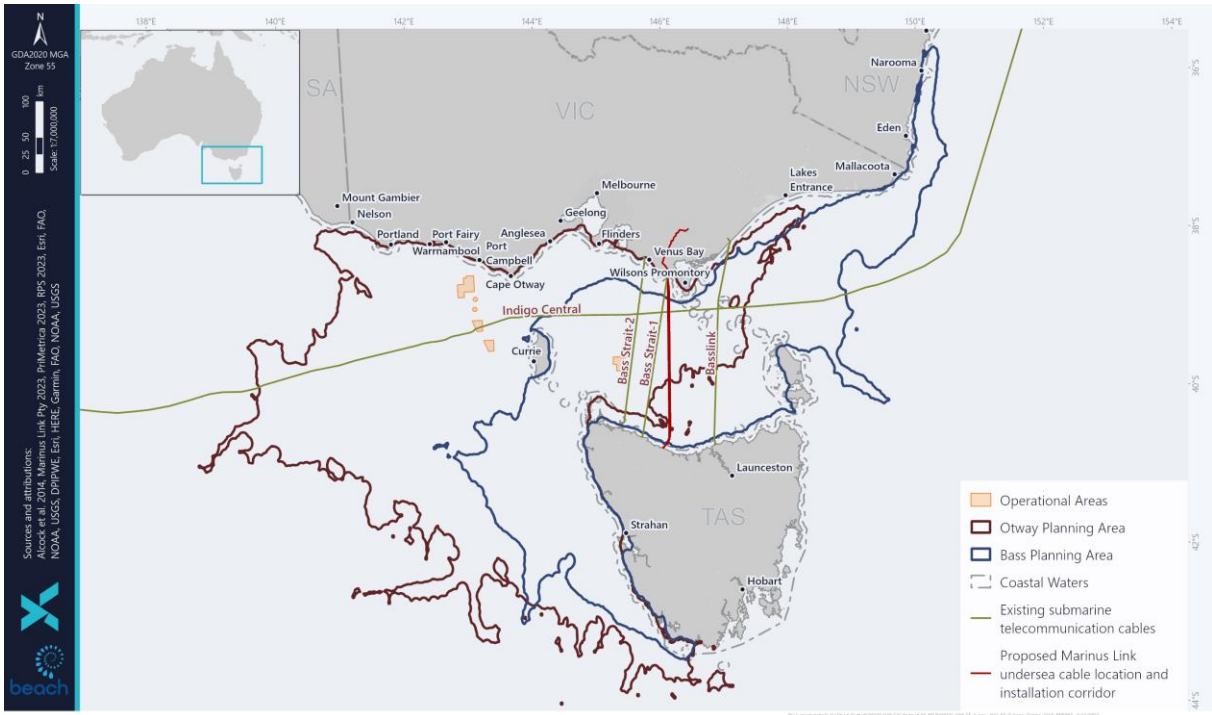


Figure 6-63: Submarine cables within the Operational and Planning Areas

6.5.4 Defence Activities

Consultation with Department of Defence (ID 1521) identified that the Operational Areas are located within restricted airspace, but no other defence areas were identified. The Department of Defence also advised that unexploded ordnance (UXO) may be present on and in the sea floor. UXO is a by-product of past training activities undertaken by the Australian Defence Force or foreign defence forces.

The interactive Department of Defence database (DoD 2023) indicates that the Otway Operational Area overlaps UXO Zone 1052 King Island (Figure 6-64), which is within the 'slight potential' category', meaning there is confirmed history of military activities that may have resulted in numerous residual hazardous munitions, components, or constituents, but where confirmed UXO affected areas cannot be defined (DoD 2022). The site was used during 1954 as an Air-to-Air Firing Range (DoD 2022).

The Otway Operational Area is 14 km east of UXO Zone SDG087 'Sea Dumping – King Island', which is identified as having been used for dumping at sea of ordnance and other items, namely ammunition including cartridges, projectiles, and fuses (DoD 2022). The Otway Operational Area is also located 38 km east of UXO Zone SDC006 'Sea Dumping – King Island', 38 km east of UXO Zone SDG136 'Sea Dumping - Victorian Coast' and 27 km east of UXO zone SDG110 'Sea Dumping – Bass Strait' (Figure 6-64). These zones are also in the sea dumping category which means the area has been identified as having been used for historical sea dumping of waste material that may include explosive ordnance (DoD 2022).

Beach undertook site surveys ahead of the previous Otway Drilling Campaign with no UXO identified. No UXO zones have been identified within the Bass Operational Area (Figure 6-64).

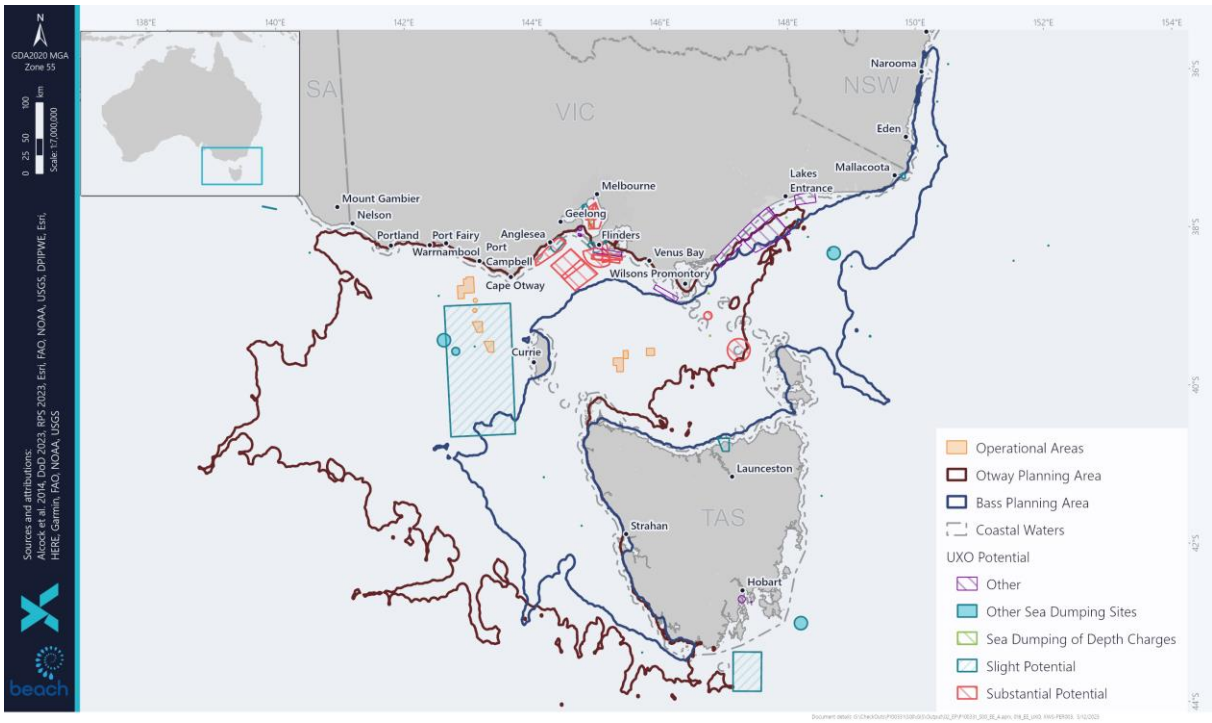


Figure 6-64: UXO within the Operational and Planning Areas

6.5.5 Shipping

The South-east Marine Region is one of the busiest shipping regions in Australia and Bass Strait is one of Australia's busiest shipping routes (Figure 6-65). Commercial vessels use the route when transiting between ports on the east, south and west coasts of Australia, and there are regular passenger and cargo services between mainland Australia and Tasmania.

Ports Australia (2022) provide statistics for port operations throughout Australia's main commercial ports. Based on the latest information (2021) the majority of commercial shipping traffic transiting to and from Victorian ports were container (3,682), general cargo (2,663, bulk liquid carriers (2,019), dry bulk (1,715), car carrier (1,342), bulk gas (220), other cargo (47) and livestock (9).

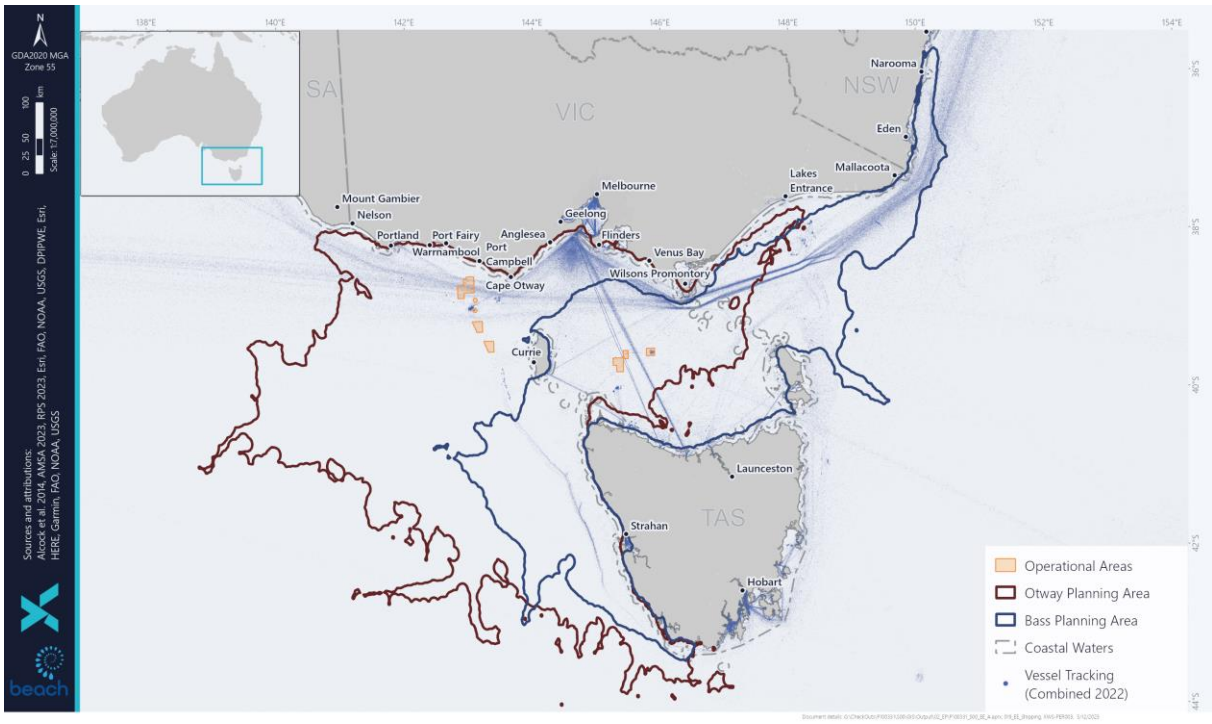


Figure 6-65: Vessel Traffic within the Operational and Planning Areas

6.5.6 Tourism

Consultation has identified that the key areas of tourism in the region include land-based sightseeing from the Great Ocean Road and lookouts along that road, helicopter sightseeing, private and chartered vessels touring into the Twelve Apostles Marine Park, diving and fishing. Land-based tourism in the region peaks over holiday periods and in 2011, Tourism Victoria reported a total of approximately 8 million visitors to the Great Ocean Road region.

Phillip Island Nature Parks reports that Phillip Island is home to the largest Little Penguin colony in the world, and every year hundreds of thousands of visitors visit the island to observe them.

Local vessels accessing the area generally launch from Boat Bay in the Bay of Islands or from Port Campbell. Given the available boat launching facilities in the area (Peterborough and Port Campbell), and the prevailing sea-state of the area, vessel-based tourism is limited.

Tourism at King Island includes activities such as fishing, surfing, kiteboarding and whale watching. The Ocean Racing Club of Victoria (ORCV) regularly holds ocean yacht races from Victoria to Tasmania each year (ORCV 2023).

6.5.7 Recreational Diving

Recreational diving occurs along the Victorian coastline. Popular diving sites near Peterborough include several shipwrecks such as the Newfield, which lies in 6 m of water and the Schomberg in 8 m of water. Peterborough provides several good shore dives at Wild Dog Cove, Massacre Bay, Crofts Bay and the Bay of Islands. In addition, there is the wreck of the Falls of Halladale (4-11 m of water) which can be accessed from shore or via boat. Open water dives to shipwrecks off the coast of Wilsons Promontory, such as the wreck of the SS Cambridge and the SS Gulf of Carpentaria are also common spots for recreational divers. King Island is also known for several wreck sites and the Waterwitch Reef. A number of operators in the region offer dive charters in the waters of King Island.

Diving activity is generally concentrated around The Arches Marine Sanctuary and the wreck sites of the Loch Ard and sometimes at the Newfield and Schomberg shipwrecks. Diving activity peaks during the rock lobster season with the bulk of recreational boats accessing the area launching from Boat Bay at the Bay of Islands or Port Campbell.

6.5.8 Recreational Fishing

Recreational fishing is popular in Victoria and is largely centred within Port Phillip Bay and Western Port, although beach- and boat-based fishing occurs along much of the Victorian coastline.

Recreational fisheries that occur within the Planning Areas are:

- Rock lobster
- Finfish (multiple species are targeted, including sharks)
- Abalone
- Scallops
- Squid
- Pipi

Of these, active recreational fishing for rock lobster, abalone, finfish, and sharks is likely to occur within the Planning Areas. Recreational scallop and squid fishing primarily occurs within Port Phillip Bay and Western Port and as such fishing for these species is possible within the Otway Planning Area. Pipi harvesting occurs in Venus Bay, within the Otway Planning Area, but due to high levels of toxins in pipis at that location the public is currently advised that they are unsafe for human consumption.

There is the potential for low levels of recreational fishing to occur within the areas of the Otway Operational Area which are nearest to shore.

6.5.9 Commonwealth Managed Fisheries

Commonwealth fisheries are managed by the Australian Fisheries Management Authority (AFMA) under the *Fisheries Management Act* 1991 (Cth). AFMA jurisdiction covers the area of ocean from 3 nm from the coast out to the 200 nm limit (the Australian Fishing Zone (AFZ)). Commonwealth commercial fisheries with jurisdictions to fish within the Planning Areas are:

- Bass Strait Central Zone Scallop Fishery (Bass Strait CZSF)
- Eastern Tuna and Billfish Fishery (ETBF)
- Skipjack Tuna Fishery
- Small Pelagic Fishery (SPF)
- Southern Bluefin Tuna Fishery (SBTF)
- Southern and Eastern Scalefish and Shark Fishery (SESSF)
- Southern Squid Jig Fishery
- Western Tuna and Billfish Fishery (WTBF)

Information relating to the target species, fishing locations, landed catch, value and other relevant aspects of each fishery is included in Table 6-32. The data in Table 6-32 is from the Commonwealth Fishery Status Report 2022 (Patterson et al. 2022) unless otherwise indicated.

Maps of fishing intensity for 2010–2020 (latest data available from AFMA) are provided where there is an overlap with fishing intensity and the Operational Areas and/or Planning Areas. The maps show the maximum area fished and the fishing intensity. Fishing intensity is mapped to show high, medium, and low intensity. The fishing intensity data has been filtered to exclude catch from areas where fewer than five boats operated during a given year. The maximum area fished shows the area fished by all fishers aggregated by 1-degree (111 km × 111 km) grid cells.

From the review of data in Table 6-32 and associated figures it was identified that the following fisheries have fishing effort within the Planning Areas: Bass Strait CZSF, ETBF, SPF, SBTF, SESSF, Southern Squid Jig Fishery and WTBF. The following fisheries have fishing effort within the Operational Areas: Bass Strait CZSF, ETBF, SESSF and Southern Squid Jig Fishery.

Table 6-32: Commonwealth Managed Fisheries within the Operational and Planning Areas

Fishery	Target species	Description	Fishing Effort Operational Area		Fishing Effort Planning Area	
			Bass	Otway	Bass	Otway
Bass Strait Central Zone Scallop Fishery	Scallops	The Bass Strait Central Zone Scallop Fishery operates in the Bass Strait between the Victorian and Tasmanian and starts at 20 nm from their respective coastlines. Commercial scallops in the Bass Strait Central Zone Scallop Fishery are mainly found at depths of 35-100 m and are caught using a steel dredge that is towed by the vessel along muddy to coarse sand substrates. Fishing effort is concentrated around King and Flinders Islands (Figure 7 59). Currently 10 active boats using towed dredges. Fishing season is 1 April to 31 December. Actual catch in 2021 was 2,344 tonnes. The major landing ports are Beauty Point, Devonport and Stanley (Tasmania); Apollo Bay, Lakes Entrance, Melbourne, Port Welshpool, Queenscliff and San Remo (Victoria) Total fishery value in 2021 was A$4.7 million. Fishing mortality: not subject to overfishing. Biomass: Not over fished. There has been fishing effort in the Bass and Otway Planning Areas based on ABARES data for 2013 – 2021. The Operational Areas overlap the maximum area fished which contains confidential fishing intensity due to less than five vessels operating. Figure 6-67 shows the total area fished with the highest fishing intensity occurring around King Island within the Bass and Otway Planning Areas.	Yes	Yes	Yes	Yes
Eastern Tuna and Billfish Fishery	Albacore tuna Bigeye tuna Yellowfin tuna Swordfish Striped marlin	The Eastern Tuna and Billfish Fishery is a longline and minor line fishery that operates in water depths > 200 m from Cape York to Victoria. Fishery effort is typically concentrated along the NSW coast and southern Queensland coast. No Victorian ports are used. In 2017 there was some fishing effort in Victoria at low levels. The number of active vessels has decreased within the fishery from around 152 in 1999 to 35 in 2021. Actual catch in the 2021 season was 5,148 tonnes. Total fishery value in 2021 was A$35.6 million. Fishing mortality: not subject to overfishing. Biomass: Overfished – striped marlin. All other species not overfished. The Bass and Otway Planning Areas and the Otway Operational Area overlap the maximum area fished based on ABARES data for 2013–2021 (Figure 6-68). The maximum area fished contains confidential fishing intensity due to less than five vessels operating. The farthest north-east extent of the Bass Planning Area overlaps areas of low to medium fishing intensity. There has been no fishing effort within the Bass Operational Area based on ABARES data for 2013–2021.	No	Yes	Yes	Yes
Skipjack Tuna Fishery (Eastern)	Skipjack tuna	The Skipjack Tuna Fishery is not currently active and the management arrangements for this fishery are under review. There has been no catch effort in this fishery since the 2008-2009 season.	No	No	No	No
Small Pelagic Fishery (Western sub-area)	Jack mackerel Blue mackerel Redbait Australian sardine	The Small Pelagic Fishery extends from the southern Queensland to southern Western Australia. Fishers use midwater trawls and purse seine nets. Geelong is a major landing port. Total retained catch of the four target species was 18,878 tonnes in the 2021-22 season. Fishery effort generally concentrated in the near-shore Great Australian Bight to the west and south of Port Lincoln. Fishing mortality: not subject to overfishing. Biomass: Not overfished. Figure 6-69 shows the Bass Planning Area and the southern-most extent of the Otway Planning Area overlap the maximum area fished based on ABARES data for 2013 – 2021. The maximum area fished contains confidential fishing intensity due to less than five vessels operating. There has been no fishing effort in the Bass or Otway Operational Areas based on ABARES data 2013 – 2021.	No	No	Yes	Yes
Southern Bluefin Tuna Fishery (SBTF)	Southern bluefin tuna	The SBTF covers the entire sea area around Australia, out to 200 nm from the coast. Southern bluefin tuna are also commonly caught off the NSW coastline. In this area, fishers catch these fish using the longline fishing method. A pelagic longline and purse seine fishery that was worth $41.39 million in 2020-21 (actual catch was 5,646 tonnes). The fishery operates year-round. Fishery effort is generally concentrated in the Great Australian Bight and off the southern NSW coast. Fishing mortality: not subject to overfishing. Biomass: Not overfished. Figure 6-70 shows the Bass and Otway Planning Areas overlap the maximum area fished based on ABARES data for 2013 – 2021. The maximum area fished contains confidential fishing intensity due to less than five vessels operating. There has been no fishing effort in the Operational Areas based on ABARES data for 2013 – 2021.	No	No	Yes	Yes

Fishery	Target species	Description	Fishing Effort Operational Area		Fishing Effort Planning Area	
			Bass	Otway	Bass	Otway
Southern and Eastern Scalefish and Shark Fishery (SESSF) Commonwealth Trawl Sector: Danish-seine	Blue-eye trevalla Blue grenadier Eastern school whiting Orange roughy Pink ling Ribaldo Tiger flathead	The Commonwealth Trawl Sector (CTS) is part of the SESSF and extends from Barrenjoey Point in northern New South Wales to Kangaroo Island in South Australia. Management of the CTS is separated into demersal otter-board trawl and Danish-seine fishing methods. Fishing in the CTS is generally concentrated along the 200 m bathymetric contour. Total retained catch of the fishery (combined with otter-board trawl and scalefish hook subsectors) was 19,501 tonnes in the 2021-22 season. In 2020-2021, the fishery value was A$64 million. No value is provided for 2021-22 season. Thirty-two otter-board trawl vessels were active during the 2021-2022 fishing season. Fishing mortality: some species subject to overfishing. Biomass: some species over fished. There has been fishing effort in the Bass and Otway Operational and Planning Areas based on ABARES data for 2013–2021/22. (Figure 6-71). The Planning Areas overlap areas of low to high relative fishing intensity. The Operational Areas overlap the maximum area fished, which contains confidential fishing intensity due to less than five vessels operating.	Yes	Yes	Yes	Yes
Southern and Eastern Scalefish and Shark Fishery (SESSF) Commonwealth Trawl Sector: Otter-board trawl	Blue-eye trevalla Blue grenadier Eastern school whiting Orange roughy Pink ling Ribaldo Tiger flathead	The Commonwealth Trawl Sector (CTS) is part of the SESSF and extends from Barrenjoey Point in northern New South Wales to Kangaroo Island in South Australia. Management of the CTS is separated into demersal otter-board trawl and Danish-seine fishing methods. Fishing in the CTS is generally concentrated along the 200 m bathymetric contour. Total retained catch of the fishery (combined with Danish-seine and scalefish hook subsectors) was 19,501 tonnes in the 2021-22 season. In 2020-2021, the fishery value was A$64 million. No value is provided for 2021-22 season. Nineteen Danish-seine vessels were active during the 2021-2022 fishing season. Fishing mortality: some species subject to overfishing. Biomass: some species over fished. The Otway Operational Area overlaps an area of low relative fishing intensity as well as the maximum area fished based on ABARES data for 2013–2021 (Figure 6-72). The Bass and Otway Planning Areas overlap areas of low to high relative fishing intensity as well as the maximum area fished (Figure 6-72). The maximum area fished contains confidential fishing intensity due to less than five vessels operating. There has been no fishing effort in the Bass Operational Area based on ABARES data for 2013–2021/22 (Figure 6-72).	No	Yes	Yes	Yes
Southern and Eastern Scalefish and Shark Fishery (SESSF) Gillnet, Hook and Trap Sector: Scalefish Hook Sub-Sector	Blue-eye trevalla Blue grenadier Eastern school whiting Orange roughy Pink ling Ribaldo Tiger flathead	The Scalefish Hook Sector (SHS) is primarily in the southeast of Australia with most fishing intensity occurring off the coast of Tasmania. The SHS is managed under the Gillnet, Hook and Trap Sector (GHTS) of the SESSF. The broader SESSF stretches south from Fraser Island in southern Queensland, around Tasmania, to Cape Leeuwin in southern Western Australia. The SHS shares target species with the CTS. Fishing is generally concentrated along the 200 m bathymetric contour. Total retained catch of the fishery (combined with CTS) was 19,501 tonnes in the 2021-22 season. In 2020-2021, the fishery value was A$64 million. No value is provided for 2021-22 season. Twenty-one scalefish hook vessels were active during the 2021-2022 fishing season. Fishing mortality: some species subject to overfishing. Biomass: some species over fished. The Bass and Otway Planning Areas and Otway Operational Areas overlap with the maximum area fished based on ABARES data for 2013 – 2021 (Figure 6-73). The maximum area fished contains confidential fishing intensity due to less than five vessels operating. The Otway Planning Area also overlaps an area of low to high relative fishing intensity off the southern coast of Tasmania (Figure 6-73). No fishing effort occurred within the Bass Operational Area based on ABARES data for 2013–2021 (Figure 6-73).	No	Yes	Yes	Yes

Fishery	Target species	Description	Fishing Effort Operational Area		Fishing Effort Planning Area	
			Bass	Otway	Bass	Otway
Southern and Eastern Scalefish and Shark Fishery (SESSF) Gillnet, Hook and Trap Sector: Shark Gillnet Sector	Gummy shark Elephantfish Sawsharks School shark	The shark gillnet and shark hook sectors (SGSHS) are part of the Gillnet, Hook and Trap Sector (GHTS) of the Southern and Eastern Scalefish and Shark Fishery (SESSF). Most fishing in the SGSHS using nets occurs in the Bass Strait while most fishing using hooks occurs off South Australia. Fishing is generally concentrated east of King Island. During the 2021-22 season, 27 shark gillnet vessels were active which hauled a total of 27,820 km of net. Total retained catch of the target species was 2,150 tonnes in the 2021-22 season. In 2020-21, the fishery value was A$28.84 million. No value is provided for 2021-22 season. Fishing mortality: school shark is uncertain. Biomass: school shark is overfished. There has been fishing effort in the Bass and Otway Planning and Operational Areas based on ABARES data for 2013 – 2021/22 (Figure 6-74). The Operational Areas overlap areas of low to medium relative fishing intensity and the Planning Areas also overlap areas of high relative fishing intensity in the waters between Tasmania and Victoria (Figure 6-74)	Yes	Yes	Yes	Yes
Southern and Eastern Scalefish and Shark Fishery (SESSF) Gillnet, Hook and Trap Sector: Shark Hook Sub-Sector	Gummy shark Sawsharks Elephantfish Sawsharks School shark	The shark gillnet and shark hook sectors (SGSHS) are part of the Gillnet, Hook and Trap Sector (GHTS) of the Southern and Eastern Scalefish and Shark Fishery (SESSF). Most fishing in the SGSHS using nets occurs in the Bass Strait while most fishing using hooks occurs off South Australia. Fishing is generally concentrated off the South Australian coast, but fishing activity also occurs in the waters around Flinders Island, particularly between Flinders Island and Tasmania. During the 2021-22 season, 40 shark hook vessels were active and set a total of 2,493,920 hooks. Total retained catch of the target species was 2,150 tonnes in the 2021-22 season. No value is provided for 2021-22 season. In 2020-21, the fishery value was A$28.84 million. Fishing mortality: school shark is uncertain. Biomass: school shark is over fished. The Bass and Otway Planning Areas overlap small areas of low to high relative fishing intensity at their eastern and western-most extents, respectively, based on ABARES data for 2013 – 2021 (Figure 6-75). A small area of low relative fishing intensity also occurs between King Island and Tasmania within the Planning Areas (Figure 6-75). The Bass and Otway Operational Areas overlap the maximum area fished (Figure 6-75). The maximum area fished contains confidential fishing intensity due to less than five vessels operating.	Yes	Yes	Yes	Yes
Southern Squid Jig Fishery	Gould's squid (arrow squid)	The Southern Squid Jig Fishery is a single species fishery that operates year-round. Portland and Queenscliff are the major Victorian landing ports. Jigging typically occurs midwater at depths between 50 and 100 m at night using large lights that illuminate the waters around a boat. In 2021, the actual catch of 939 tonnes was worth A$3.30 million. In 2021 there were eight active vessels in the fishery with the landing ports being Triabunna (Tasmania); Queenscliff and Apollo Bay (Victoria). Fishing mortality: not subject to overfishing. Biomass: not overfished. The Otway Operational Area overlaps an area of low relative fishing intensity, and the Otway Planning Area overlaps an area of low to high relative fishing intensity west of Cape Otway based on ABARES data for 2013–2021 (Figure 6-76). The Bass Operational and Planning Areas overlap the maximum area fished, which contains confidential fishing intensity due to less than five vessels operating (Figure 6-76). Figure 6-76 shows the total area fished with squid jig in 2021 with the highest fishing intensity occurring near Portland within the Otway Planning Area.	Yes	Yes	Yes	Yes
Western Tuna and Billfish Fishery	Bigeye tuna Yellowfin tuna Broadbill Swordfish Striped marlin	The Western Tuna and Billfish Fishery primarily uses pelagic longline gear with low levels of minor-line fishing. The management area extends west from the eastern border of South Australia to Cape York, including Cocos Keeling Islands and Christmas Island. Fishing effort in recent years has been mostly concentrated in south-west Western Australia with occasional activity off South Australia. The value of the fishery is confidential but the total annual catch of the fishery in 2021 was 252 tonnes. Less than five vessels have been active in the fishery every year since 2005. Fishing mortality: striped marlin, albacore, bigeye tuna and yellowfin tuna subject to overfishing. Biomass: striped marlin overfished. The Otway Planning Area overlaps the maximum area fished which contains confidential fishing intensity due to less than 5 vessels operating (Figure 6-77). No fishing effort was identified in the Operational Areas or Bass Planning Area.	No	No	No	Yes

Data/information sources: Australian Fisheries Management Authority (www.afma.gov.au), ABARES Fishery Status Reports 2014 to 2022.

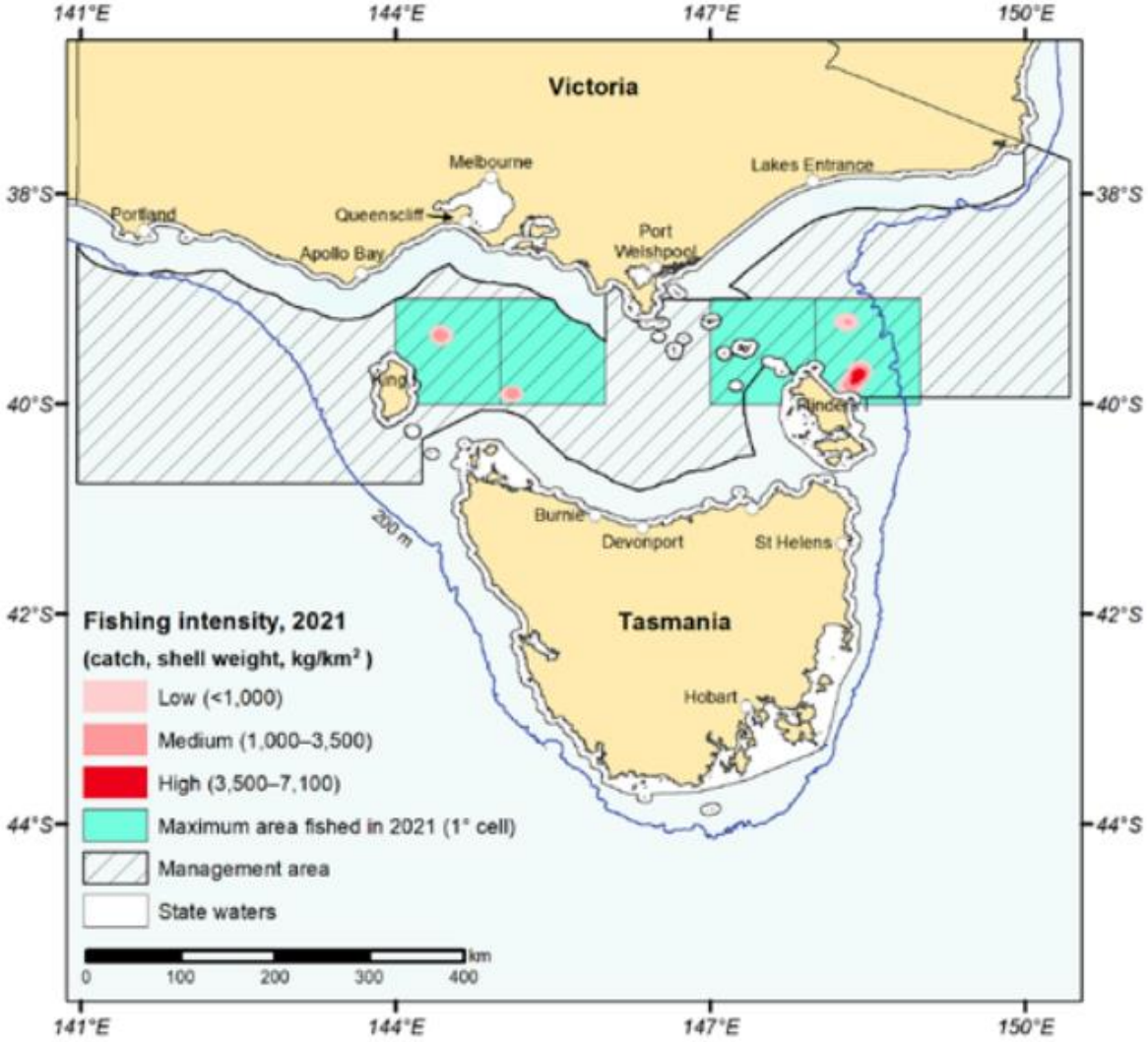


Figure 6-66: Jurisdiction of and Fishing Intensity of the Bass Strait Central Zone Scallop Fishery

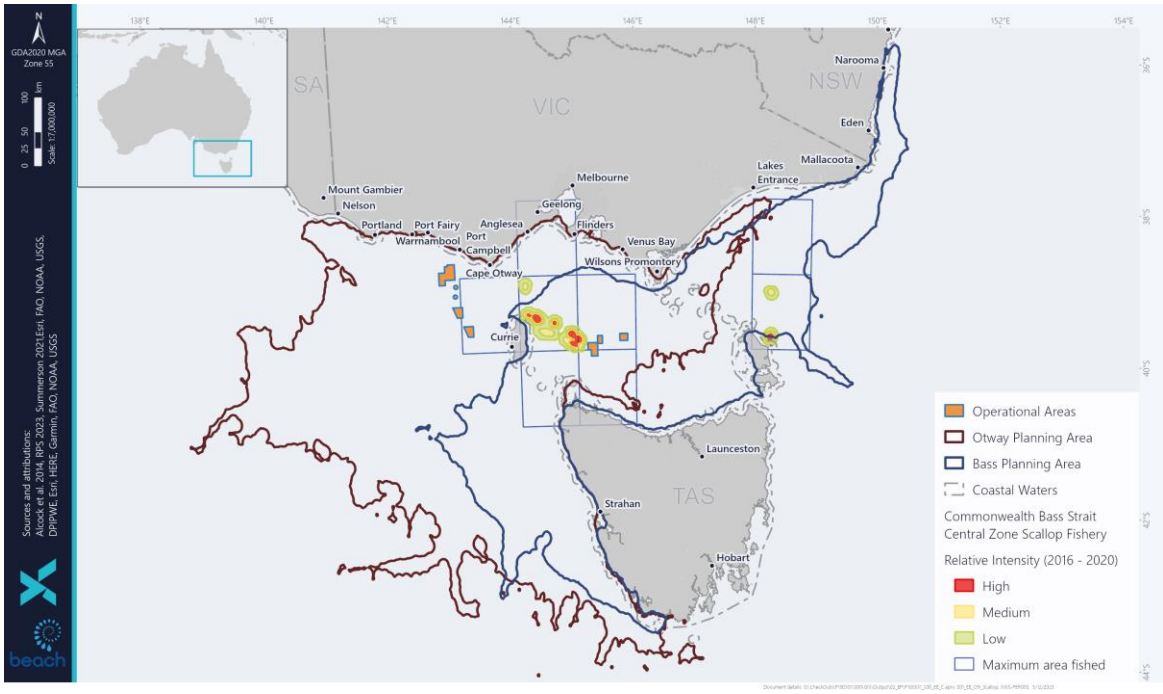


Figure 6-67: Commonwealth Bass Strait Central Zone Scallop Fishery Fishing Intensity (effort, net length, m/km^2) and Maximum Area Fished

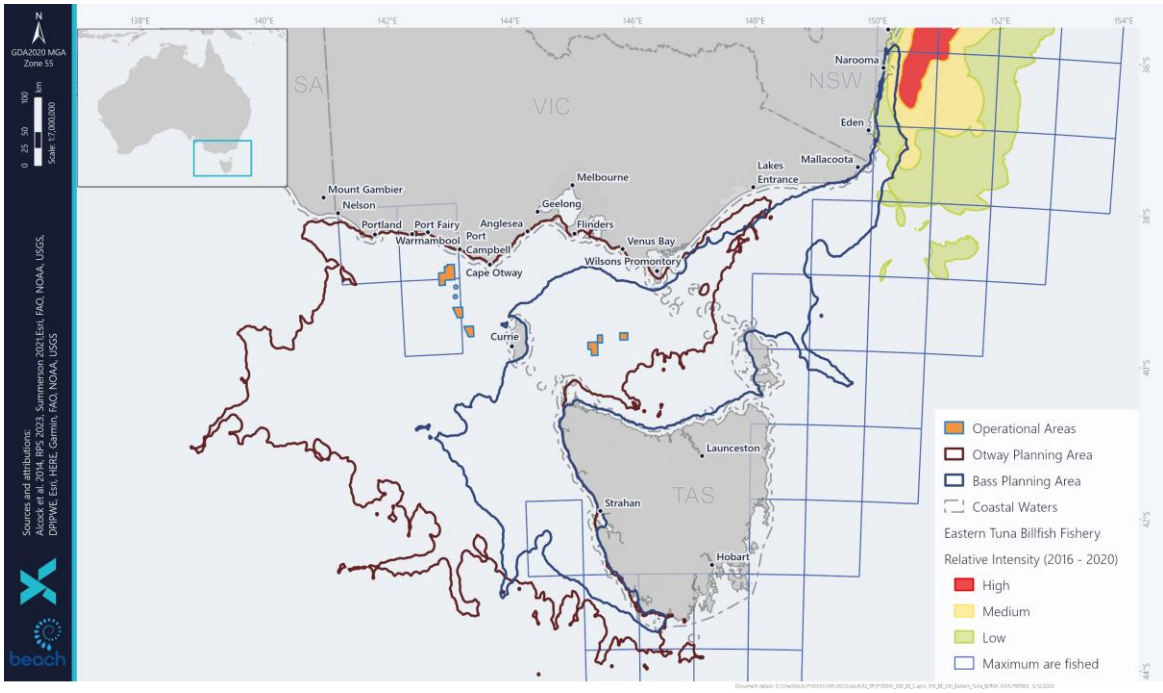


Figure 6-68: Commonwealth Eastern Tuna and Billfish Fishery Fishing Intensity (effort, net length, m/km^2) and Maximum Area Fished

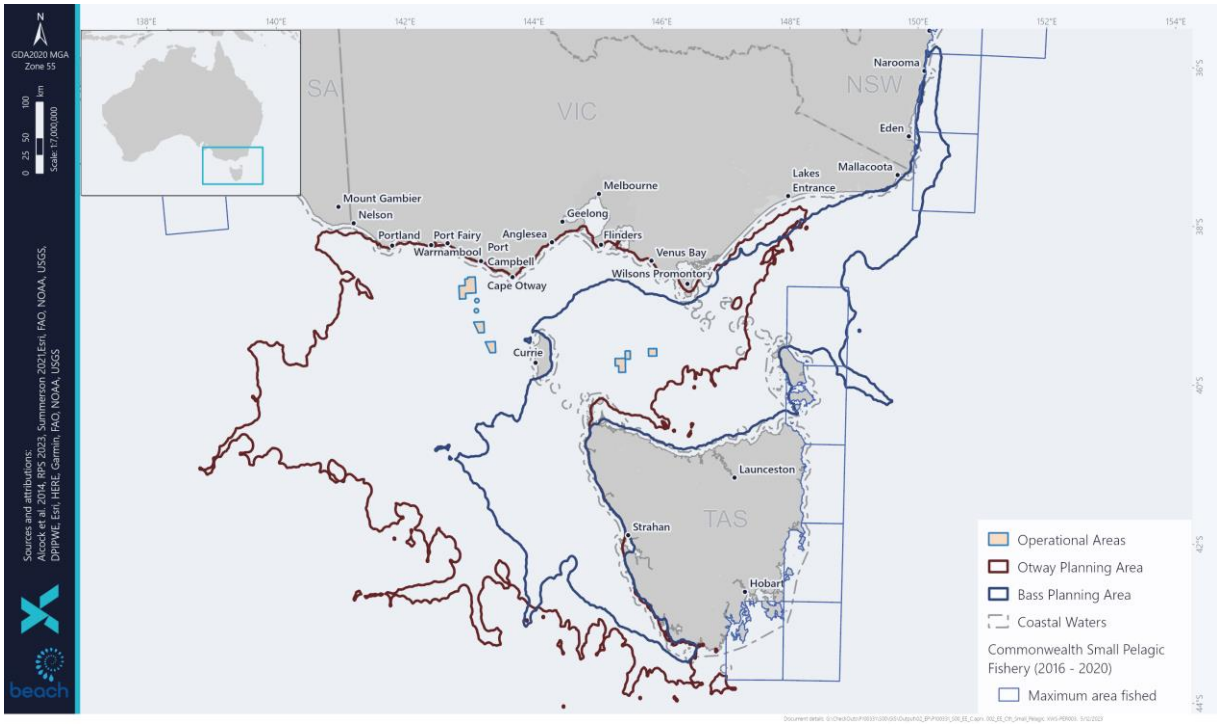


Figure 6-69: Commonwealth Small Pelagic Fishery Fishing Intensity (effort, net length, m/km^2) and Maximum Area Fished

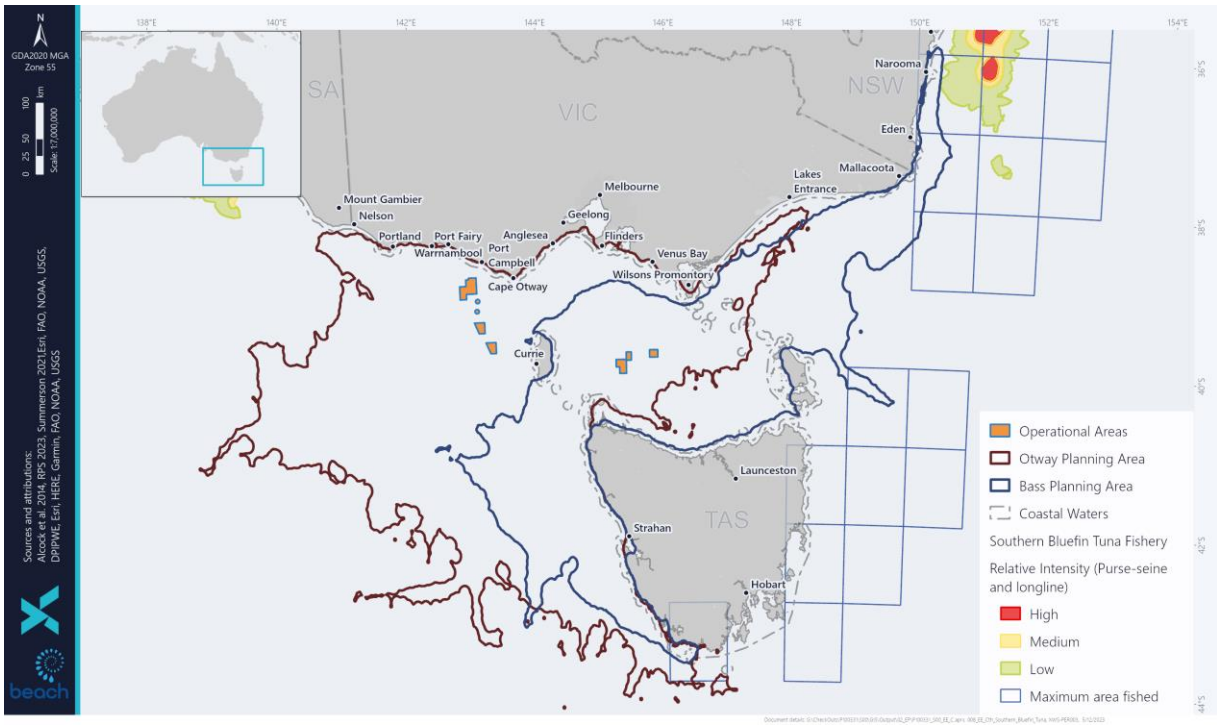


Figure 6-70: Southern Bluefin Tuna Fishery Fishing Intensity (effort, net length, m/km^2) and Maximum Area Fished

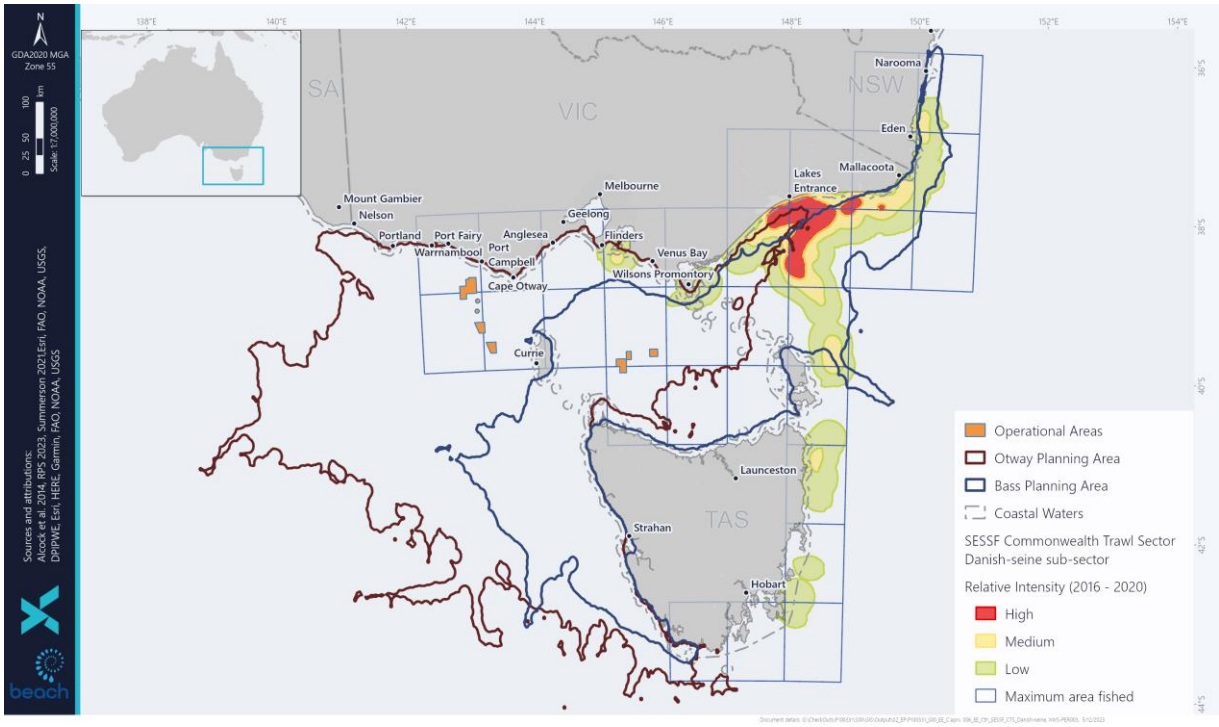


Figure 6-71: Southern and Eastern Scalefish and Shark Fishery (Commonwealth Trawl Sector) Danish-seine Fishing Intensity (effort, net length, m/km^2) and Maximum Area Fished

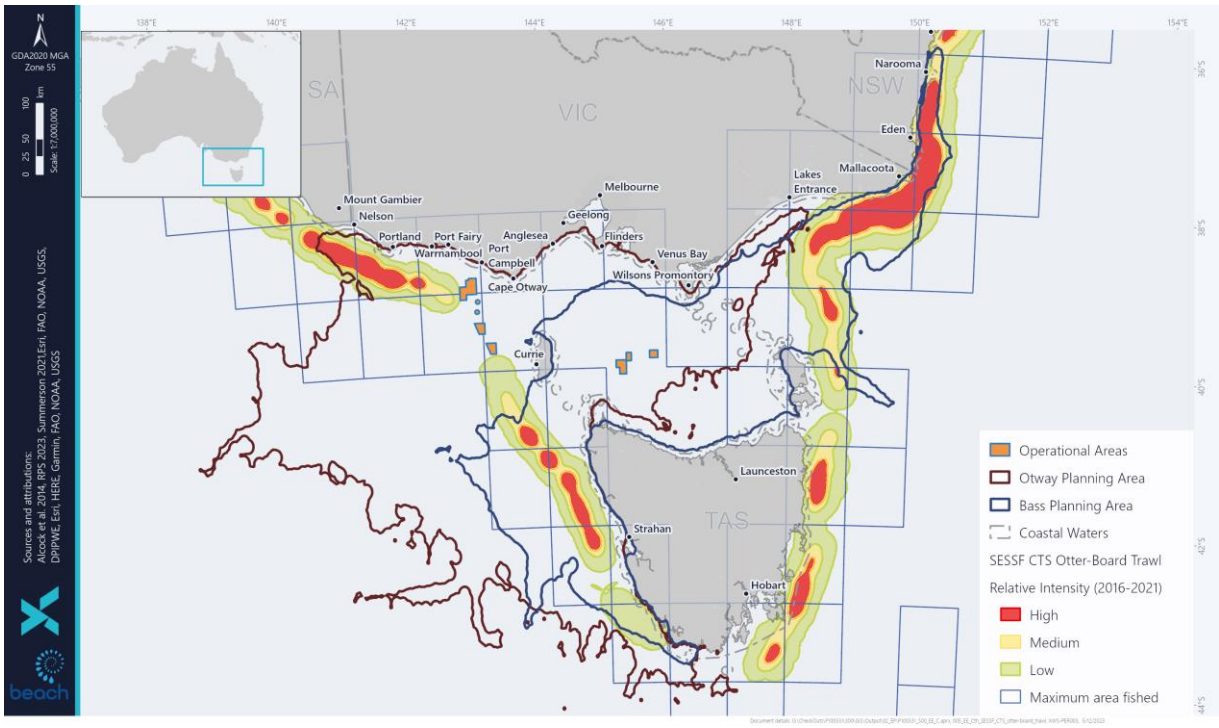


Figure 6-72: Southern and Eastern Scalefish and Shark Fishery (Commonwealth Trawl Sector) Otter Board Trawl Fishing Intensity (effort, net length, m/km^2) and Maximum Area Fished

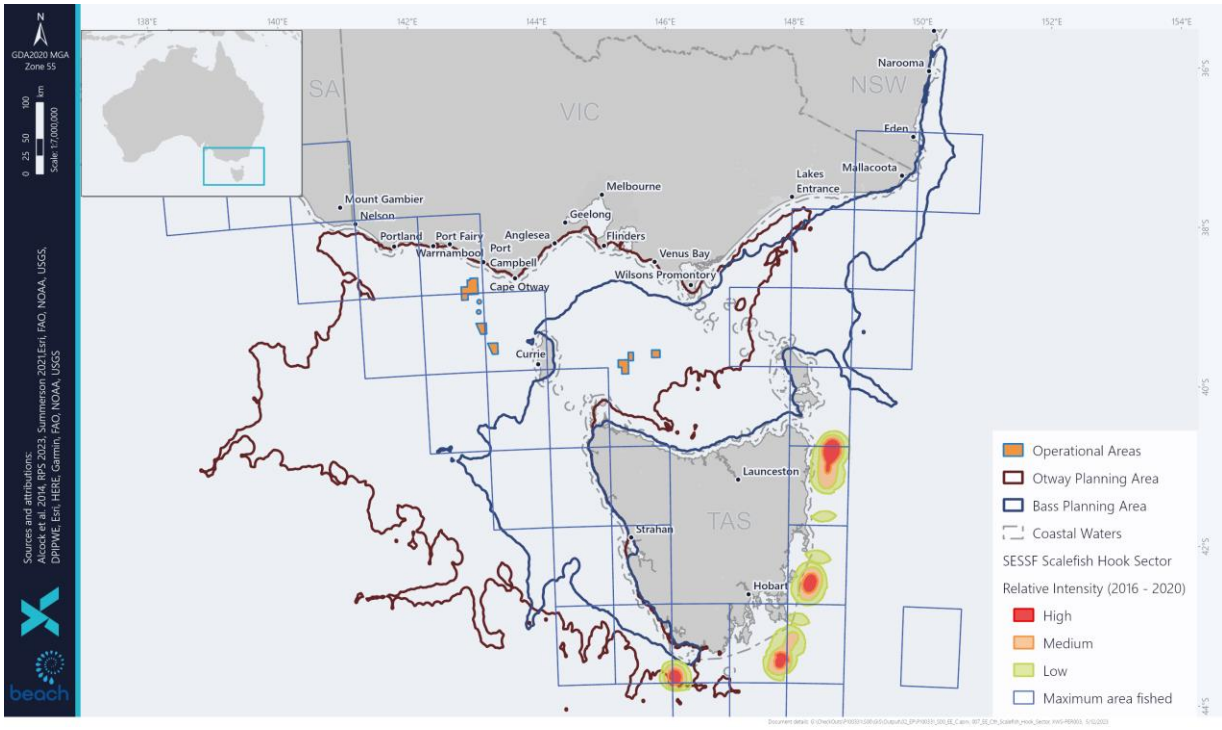


Figure 6-73: Southern and Eastern Scalefish and Shark Fishery (Gillnet Hook and Trap Sector) Scalefish Hook Fishing Intensity (effort, net length, m/km^2) and Maximum Area Fished

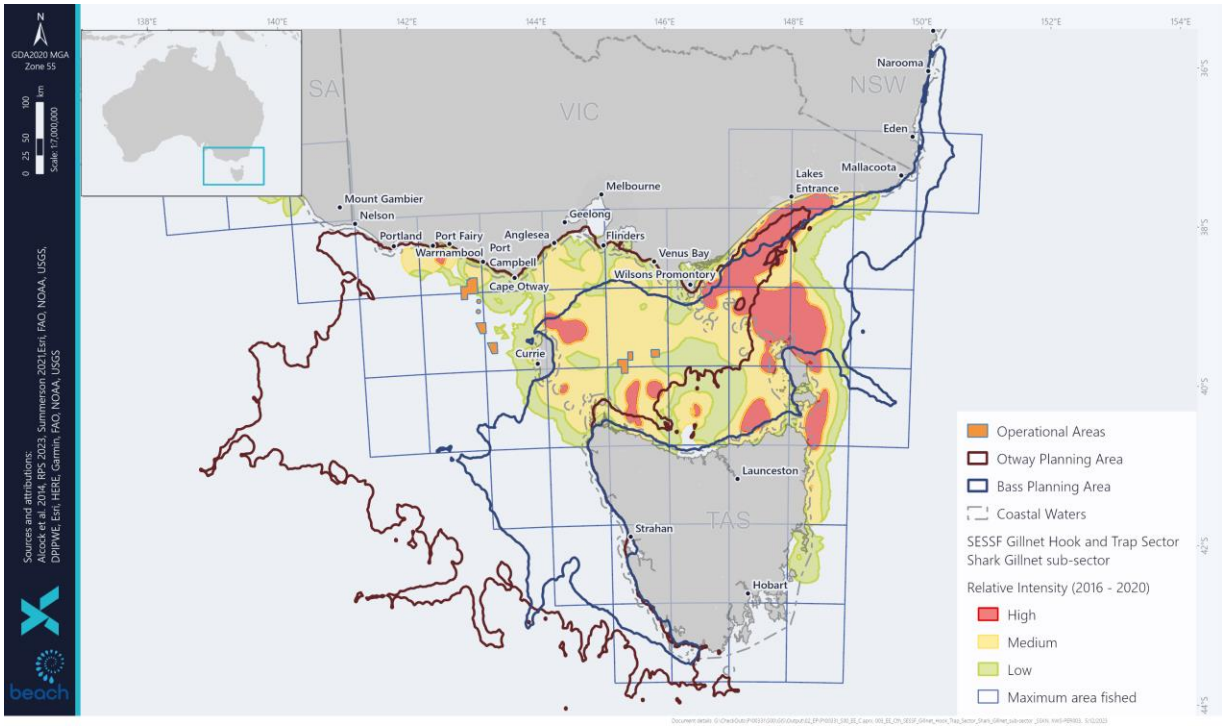


Figure 6-74: Southern and Eastern Scalefish and Shark Fishery (Gillnet Hook and Trap Sector) Shark Gillnet Fishing Intensity (effort, net length, m/km^2) and Maximum Area Fished

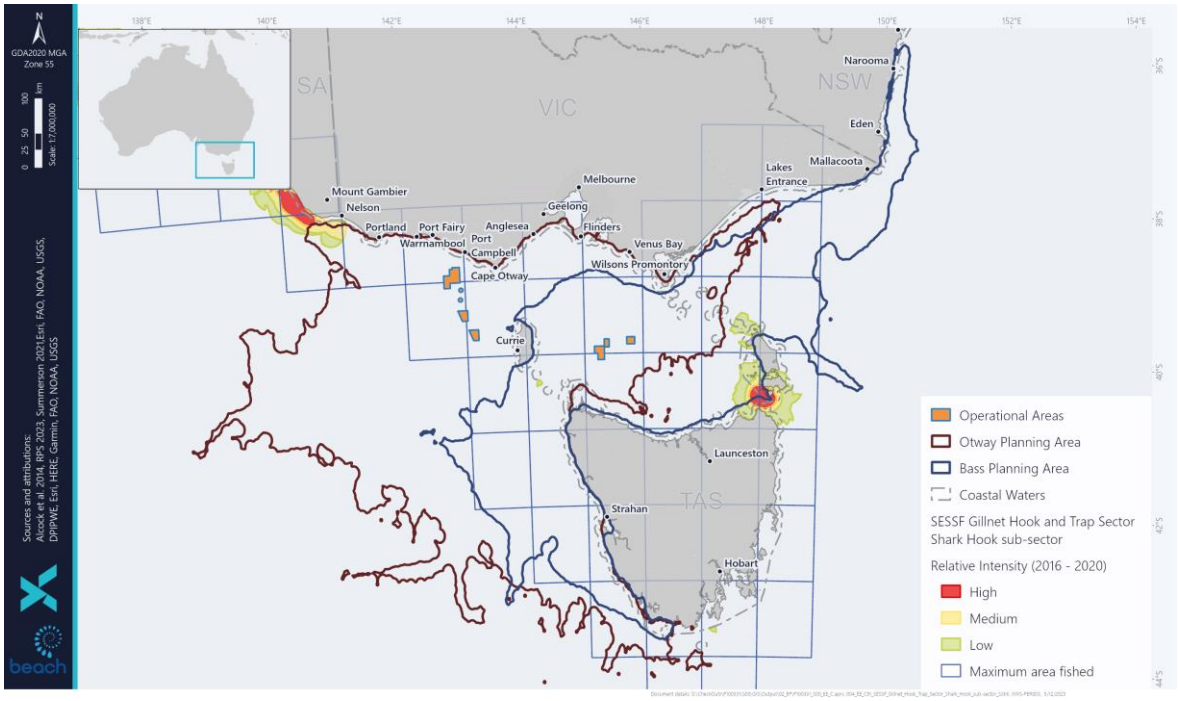


Figure 6-75: Southern and Eastern Scalefish and Shark Fishery (Shark Hook Sector) Fishing Intensity (effort, net length, m/km^2)

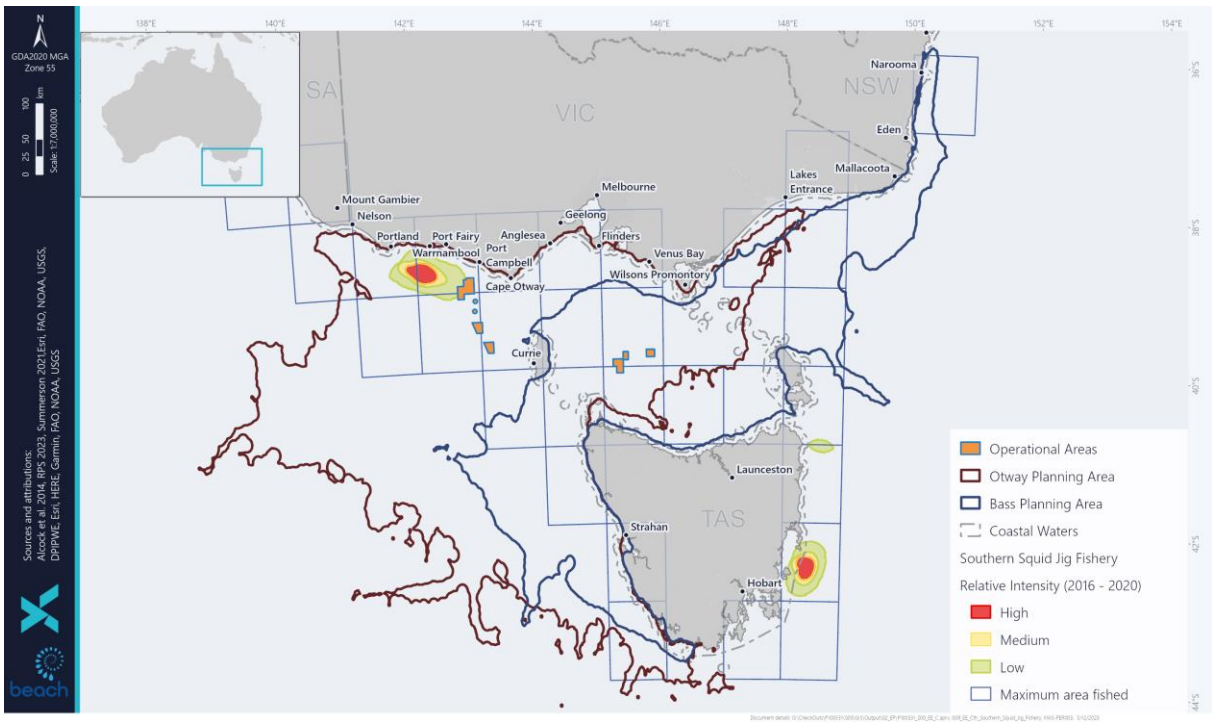


Figure 6-76: Southern Squid Jig Fishery Fishing Intensity (effort, net length, m/km^2)

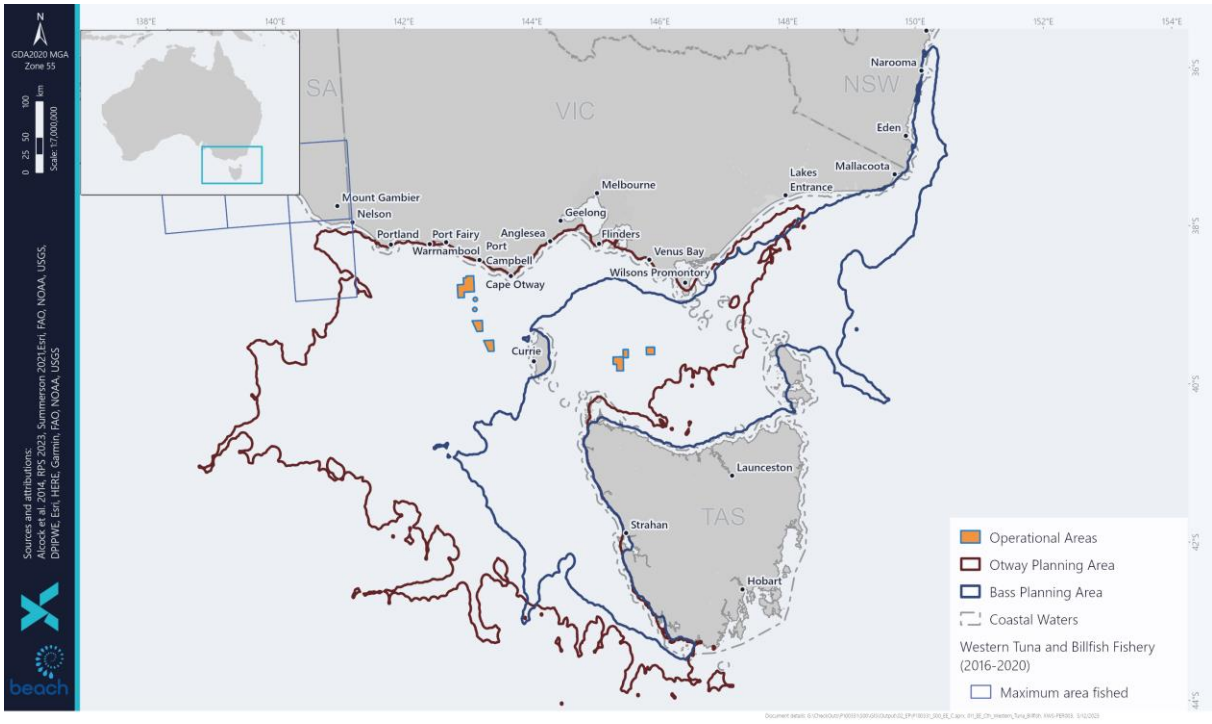


Figure 6-77: Western Tuna and Billfish Fishery Fishing Intensity (effort, net length, m/km^2)

6.5.10 New South Wales Managed Fisheries

NSW state fisheries are managed by the Department of Primary Industries (DPI) under the *Fisheries Management Act 1994*. DPI jurisdiction covers all waters that are within the limits of the state with additional offshore constitutional settlements for specific fisheries beyond state boundaries into Commonwealth waters. NSW-managed commercial fisheries with access licences that authorise harvest in the Planning Areas are detailed below. Though certain fisheries possess jurisdiction to fish within the area, analysis of publicly available and requested catch data indicates that not all fisheries have recently actively fished within the Planning Areas. NSW managed fisheries active within the Planning Areas include:

- Abalone
- Developmental Commercial
- Estuary General
- Inland Restricted
- Lobster
- Ocean Hauling
- Ocean Trap and Line
- Southern Fish Trawl
- Ocean Trawl
- Sea Urchin and Turban Shell Restricted Fishery
- s37 Permit

Information relating to the target species, fishing locations, landed catch, value and other relevant aspects of each fishery is included in Table 6-33.

Table 6-33: New South Wales Managed Fisheries in the Planning Area

Fishery	Target species	Description	Fishing Effort Operational Area		Fishing Effort Planning Area	
			Bass	Otway	Bass	Otway
Abalone	Blacklip abalone	This fishery extends along the NSW coastline between the Queensland and Victorian borders. Most commercial abalone fishing takes place on the south coast of NSW, primarily from Jervis Bay to the Victorian border, with most abalone found close to the shore. Abalone are harvested by divers and occurs year-round. Recent catch for 2019 was 83 t (valued at $3.6 million) with 3-11 active vessels recorded between 2016-2021 in the Bass Planning Area (Figure 6-78). The water depths are fished close to shore within the Bass Planning Area. No fishing effort was identified in the Operational Area. (DPI 2022b, DPI 2019a, DPI 2018).	No	No	Yes	No
Development Commercial		The Development Commercial fishery was established to allow for exploration of new fishery options. There have been instances where individuals or groups have expressed an interest in exploring opportunities to harvest marine resources, they perceive to be under-utilised in NSW waters, or use unique fishing methods not currently authorised. The State may allow for an application to be logged with the NSW Department of Primary Industries where the department may determine if a particular developmental fishery is likely to bring considerable benefit to the State and whether it warrants the investment of resources (DPI 2019c). Currently there are 5 applications being assessed undertake developmental commercial fishing activities by the department and no new applications are being accepted (DPI 2019c).	No	No	Yes	No
Estuary General	Sea mullet Luderick Yellowfin bream School prawn Blue swimmer crab Dusky flathead Sand whiting Pipi	The Estuary General Fishery is a diverse multi-species multi-method fishery operating throughout 76 of NSW's estuarine systems. It is the most diverse commercial fishery in NSW and comprises approximately 600 fishing businesses authorised to utilise 17 types of fishing gear (DPI 2019c). During the 2019-2020 season 2,784 t was caught and valued at $23 million (DPI 2022b). The fishery is divided geographically into 7 regions along the NSW coastline. The primary management control is enforcing a limit on the number of fishers who are authorised to operate. The Bass Planning Area overlaps with the Lower South Coast region which had 14 active businesses in the 2019-2020 season, however	No	No	Yes	No

Fishery	Target species	Description	Fishing Effort Operational Area		Fishing Effort Planning Area	
			Bass	Otway	Bass	Otway
	Mud crab Silver biddy	there was no reported catch within the Planning Area between 2016-2021 (DPI 2022b)				
Estuary Prawn Trawl	School prawn Eastern king prawns	This fishery uses otter trawl nets to target prawn species in three estuaries in NSW (the Clarence, Hawkesbury and Hunter Rivers). The fishery typically operates for defined seasons which are generally October to May (with the exception of Hawkesbury River) (DPI 2023a). The majority off catch effort for this fishery occurs outside of the Planning Area	No	No	No	No
Inland Restricted	Carp Yabbies	This fishery is a small fishery that primarily operates in the inland waters of the Murray-Darling. Carp is currently targeted as a pest species and averages between $2.00-$2.50 per kg in Sydney and Melbourne markets. Commercial fishing for yabbies commenced in 1974/1975. Commercial fishers targeting yabbies use baited trap methods and have access to all waters of the Newell Highway. Carp targeted fisheries utilise nets and traps fishing methods and have access to all NSW inland waters (DPI 2022b)	No	No	Yes	No
Lobster	Eastern rock lobster	A highly valuable fishery (valued at $10.9 million in 2019). Lobster are caught using baited traps (pots). The NSW Lobster Fishery extends from the Queensland border to the Victorian border and includes all waters under jurisdiction of NSW to around 80 miles from the coast. Fishing season occurs between 1 August and 3 May with monthly landings are typically highest in December and January. The fishery is primarily managed by total allowable commercial catch and individual quota allocation with additional input controls such as a prohibition on taking berried females and minimum/maximum size limits. Recent catch data for 2019 was 178 t. There are between 3-11 vessels operational in the Bass Planning Area (Figure 6-79) (DPI 2019b, DPI 2022b).	No	No	Yes	No
Ocean Hauling	Pilchards Sea mullet Australian salmon Blue mackerel Yellowtail Scad	The Ocean Hauling fishery targets approximately 20 finfish species using commercial hauling and purse seine nets from sea beaches and in ocean waters within 3 nautical miles of the NSW coast. The ocean hauling fishery became a restricted fishery in 1995 and moved to a share management fishery in 2007. Fishing occurs year-round. Recent catch data recorded 3,886 t valued at $10 million in 2019. There are between 4-9 operational licences within the Bass Planning Area between 2016-2021 (Figure 6-80) (DPI 2022b, DPI 2019c).	No	No	Yes	No

Fishery	Target species	Description	Fishing Effort Operational Area		Fishing Effort Planning Area	
			Bass	Otway	Bass	Otway
	Yellowfin Bream					
Ocean Trap and Line	Snapper Yellowtail kingfish Leatherjackets Bonito Silver trevally Rubberlip (grey) morwong Blue-eye trevalla Sharks Bar cod Yellowfin bream Spanner crabs	The Ocean Trap and Line fishery is a multi-method, multi species fishery targeting demersal and pelagic fish along the entire NSW coast, in continental shelf and slope waters. It is a share managed fishery with 6 endorsements which determine the location and methods used by fishers. Fishing occurs year-round. Recent catch data for 2019 showed a catch of 1,352 t values at $13 million. The majority of stock within the management area are classified as sustainable. However, the grey morwong stock, silver trevally stock, and school shark stock are classified as depleted. There are between 5-40 operational vessels recorded within the Bass Planning Area between 2016-2021 (Figure 6-81) (DPI 2022b, DPI 2021, DPI 2006).	No	No	Yes	No
Southern Fish Trawl		The NSW Southern Fish Trawl Fishery was located within the coastal waters of NSW and spanned between Sydney and the Victoria-NSW border. This restricted fishery once fell under the jurisdiction of the Ocean Trawl Fishery and was managed under the fish trawl sector. In 2019 the Southern Fish Trawl Fishery was integrated into the Commonwealth Southern and Eastern Scalefish and Shark Fishery (SESSF) due to the substantial overlap between the two fisheries (DPI 2018b). This change was implemented in hopes that that joint management of fish stocks would removing duplication and administrative burden for operators currently operating across the two fisheries. Between 2016-2021 a total of 1,160.7 t was landed within the Bass Planning Area (Figure 6-82) (DPI 2022b).	No	No	Yes	No
Ocean Trawl	Stout whiting Red spot whiting Eastern king prawn Eastern school prawn	There are 2 sectors to the NSW Ocean Trawl Fishery; the prawn trawl sector and the fish trawl sector which operate along the entire NSW coast, in continental shelf and slope waters. Fishing occurs year-round, with both sectors use similar gear, the otter trawl net, and many of the fishers endorsed for fish trawling are also endorsed for prawn trawling. It is a share managed fishery with endorsements outlining fishing methods and location the holder can use and	No	No	Yes	No

Fishery	Target species	Description	Fishing Effort Operational Area		Fishing Effort Planning Area	
			Bass	Otway	Bass	Otway
	Royal red prawn Tiger flathead Silver trevally Various species of sharks and rays, squid and octopus.	fish within. Recent catch data for 2016 was 2,672 t valued at $26.2 million. Operational vessel data for this industry is confidential (Figure 6-83) (DPI 2022b, DPI 2021).				
Sea Urchin and Turban Shell Restricted Fishery	Sea Urchin Turban Shell	The NSW Sea Urchin and Turban Shell restricted fishery is relatively small with few divers participating and 37 fishing businesses holding endorsements. All harvesting is done manually, and most commercial fishers will dive for species using surface supplied compressed air (hookah). Harvesting occurs throughout the year however restrictions and closures may apply for individual species. During the 2019-2020 season 126 t was caught and valued at $0.5 million (DPI 2022b). The fishery is managed by regional catch limits which were set at 30 t total for the 2023 fishing period (DPI 2019c). The EMBA overlaps with 3 of the 5 sea urchin and turban shell regions. Indicators for the Sea Urchin and Turban Shell fishery are reported at the state level only due to the small number of active fishers. Between 2016-2021 a total of 543.1 t was landed within the Bass Planning Area (Figure 6-84) (DPI 2022b).	No	No	Yes	No
s37 Permit	Marine vegetation collection, aquarium collection, imports, scientific collection and oyster collection	In NSW miscellaneous permits are managed under Section 37 which includes permits like marine vegetation collection, aquarium collection, imports, scientific collection and oyster collection. These section permits are required for any activity that involves taking or possessing fish or marine vegetation that would otherwise be unlawful under the Fisheries Management Act 1994 (DPI 2017). Applications require an environmental assessment and the inclusion of the appropriate fee. Between 2016-2021 a total of 572.7 t was landed within the Bass Planning Area (Figure 6-85) (DPI 2022b).	No	No	Yes	No

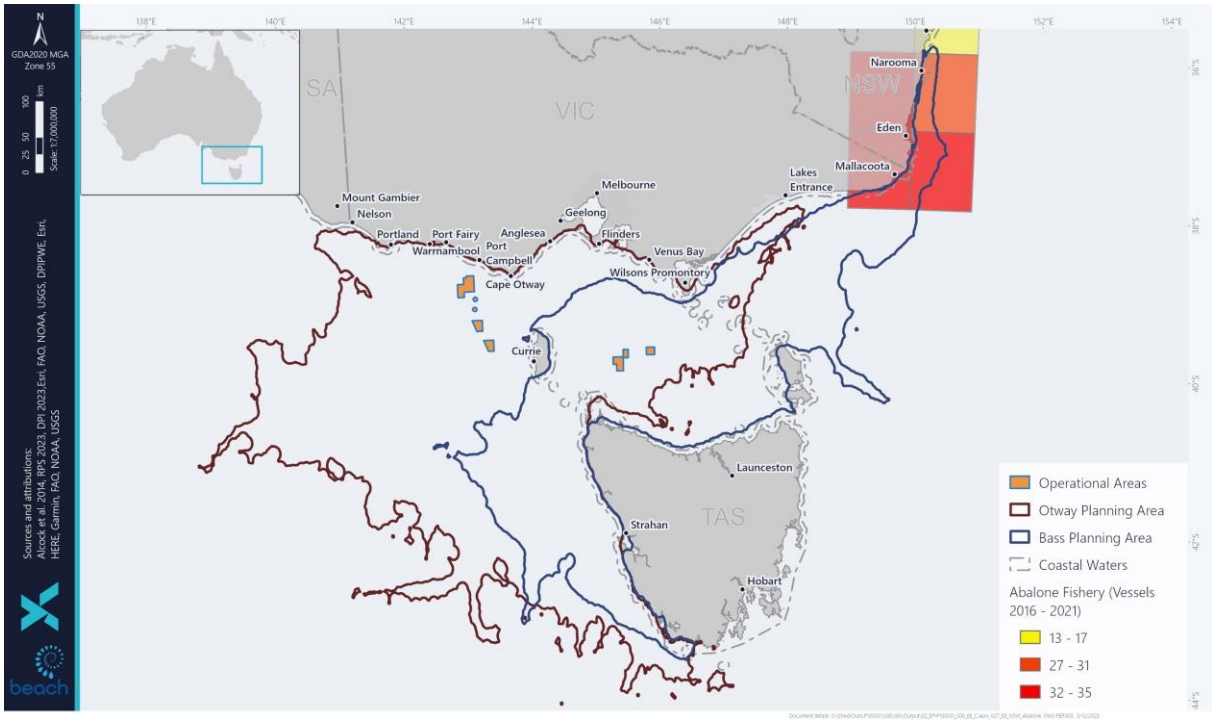


Figure 6-78: NSW Abalone Fishery Number of Vessels from 2016-2021. Data obtained from DPI 2023.

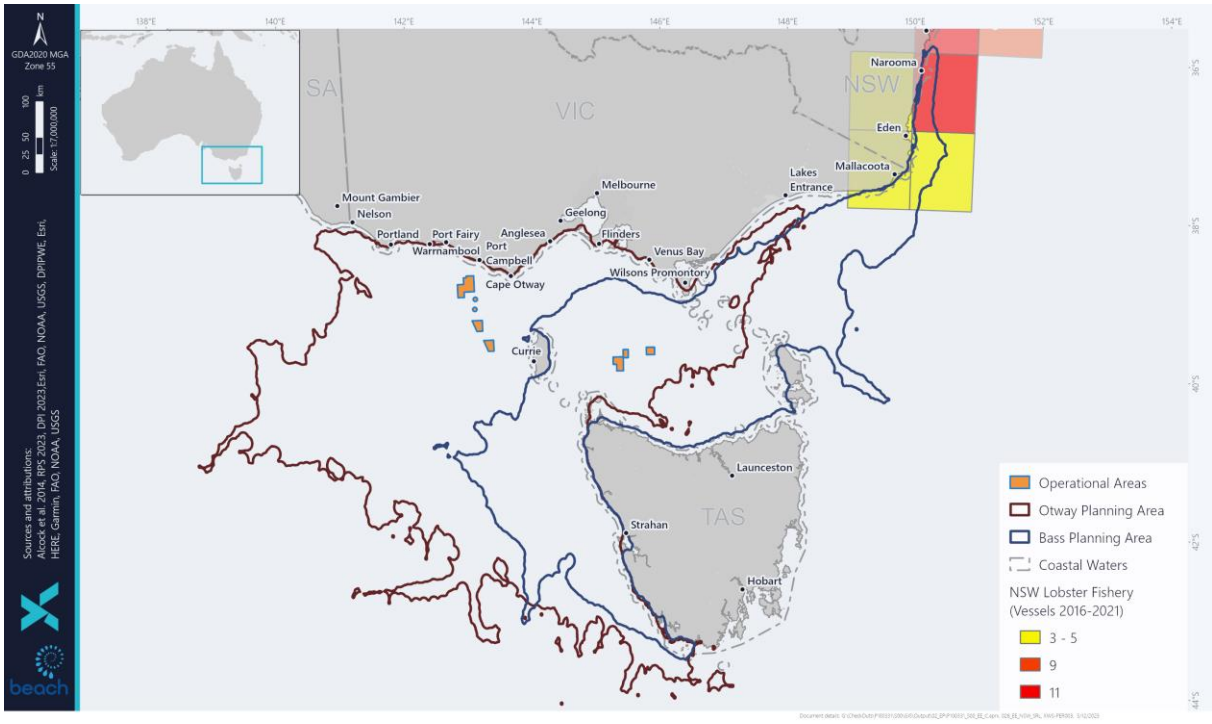


Figure 6-79: NSW Lobster Fishery Number of Vessels from 2016-2021. Data obtained from DPI 2023.

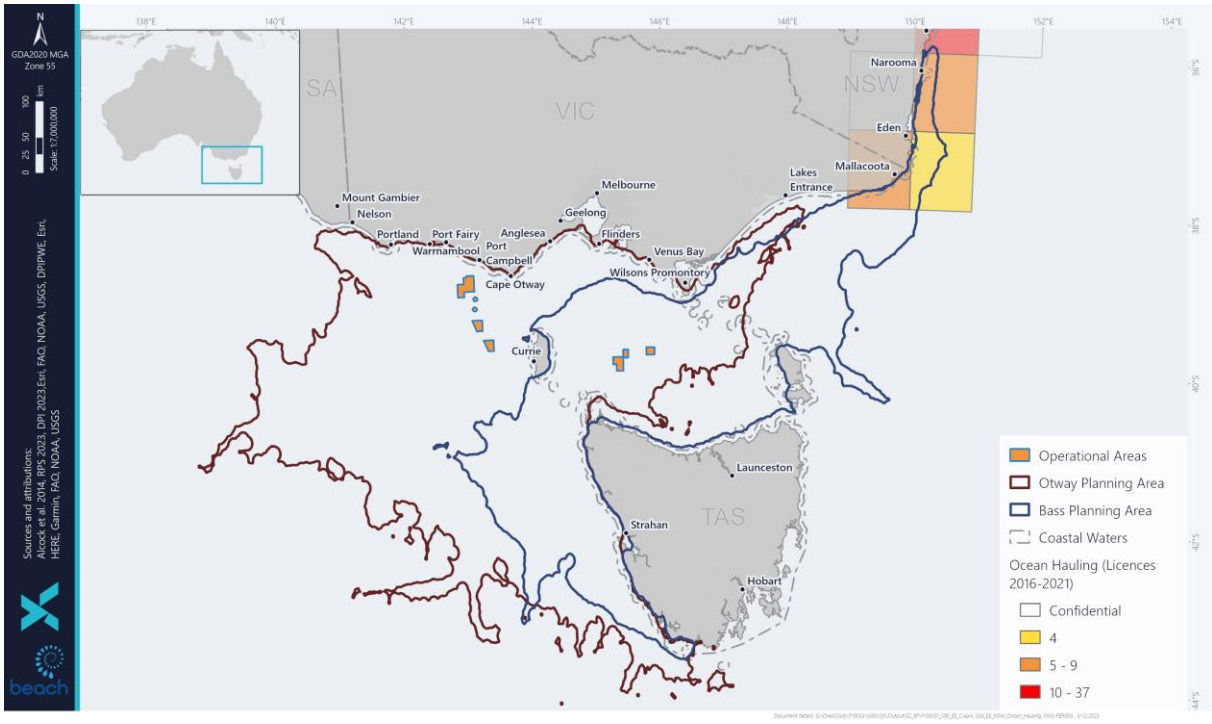


Figure 6-80: NSW Ocean Hauling Fishery Number of Licences from 2016-2021. Data obtained from DPI 2023.

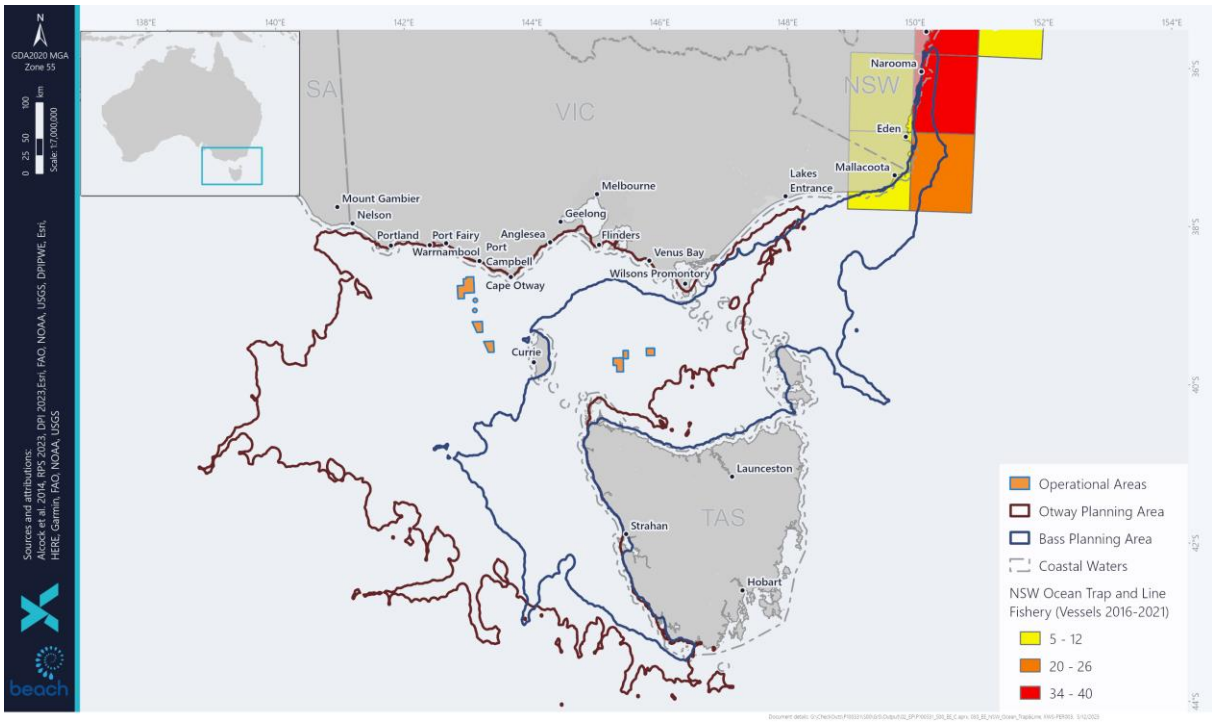


Figure 6-81: NSW Ocean Trap and Line Fishery Number of Vessels from 2016-2021. Data obtained from DPI 2023.

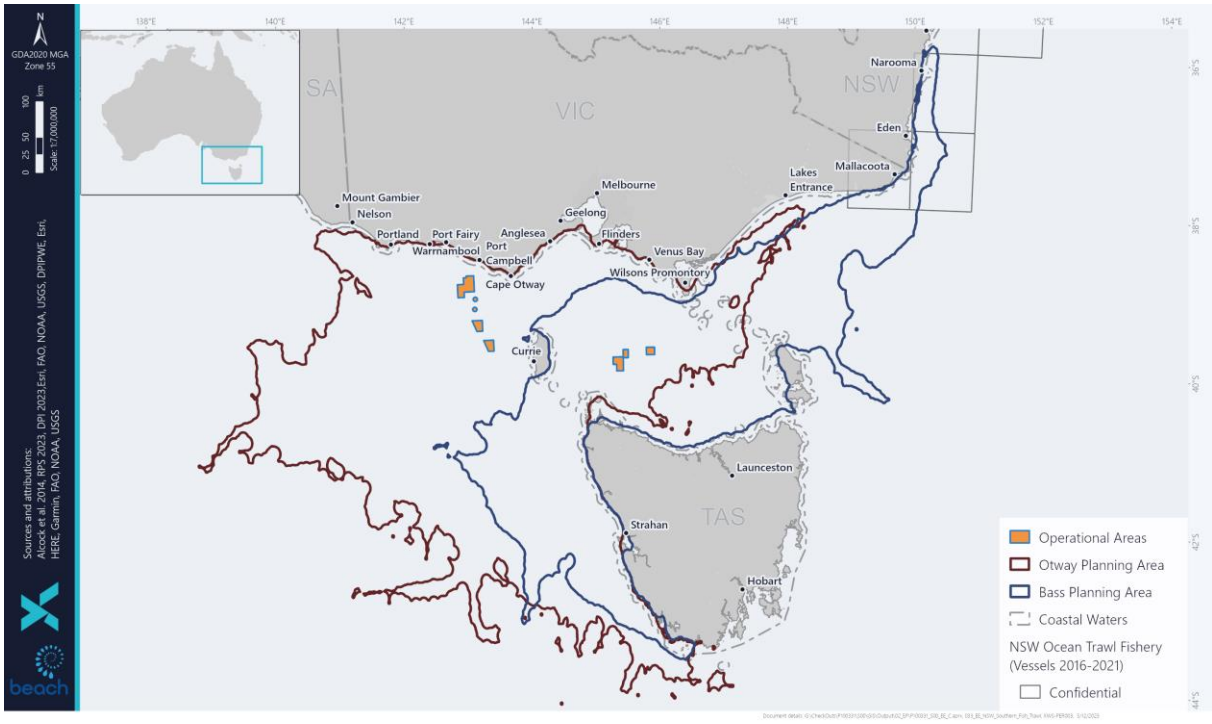


Figure 6-82: NSW Southern Fish Trawl Fishery Number of Vessels from 2016-2021. Data obtained from DPI 2023.

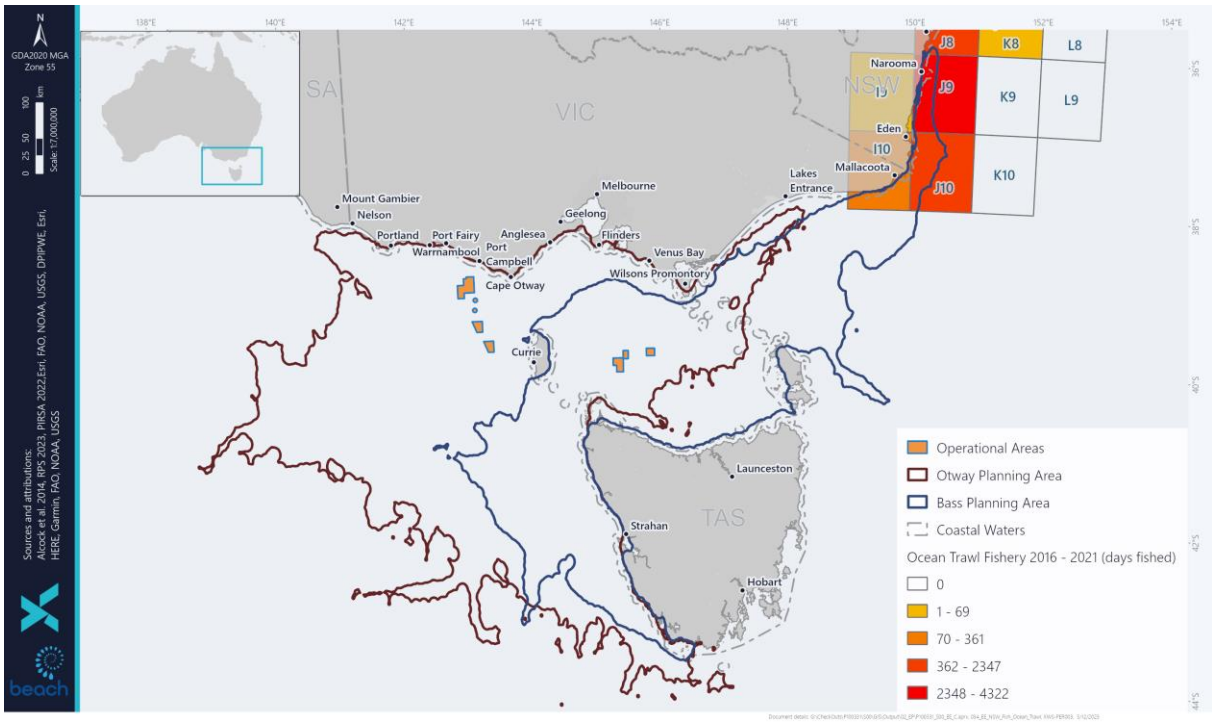


Figure 6-83: NSW Ocean Trawl Fishery Days Fished from 2016-2021. Data obtained from DPI 2023.

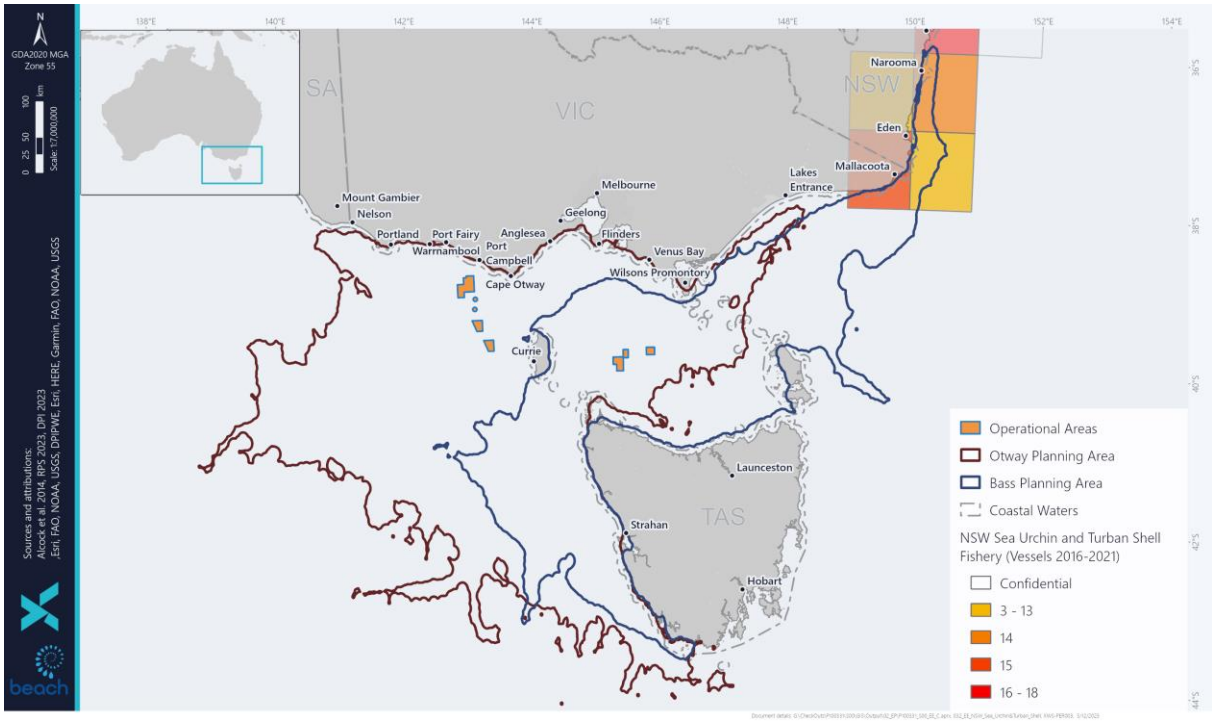


Figure 6-84: NSW Sea Urchin and Turban Shell Fishery Number of Vessels from 2016-2021. Data obtained from DPI 2023.

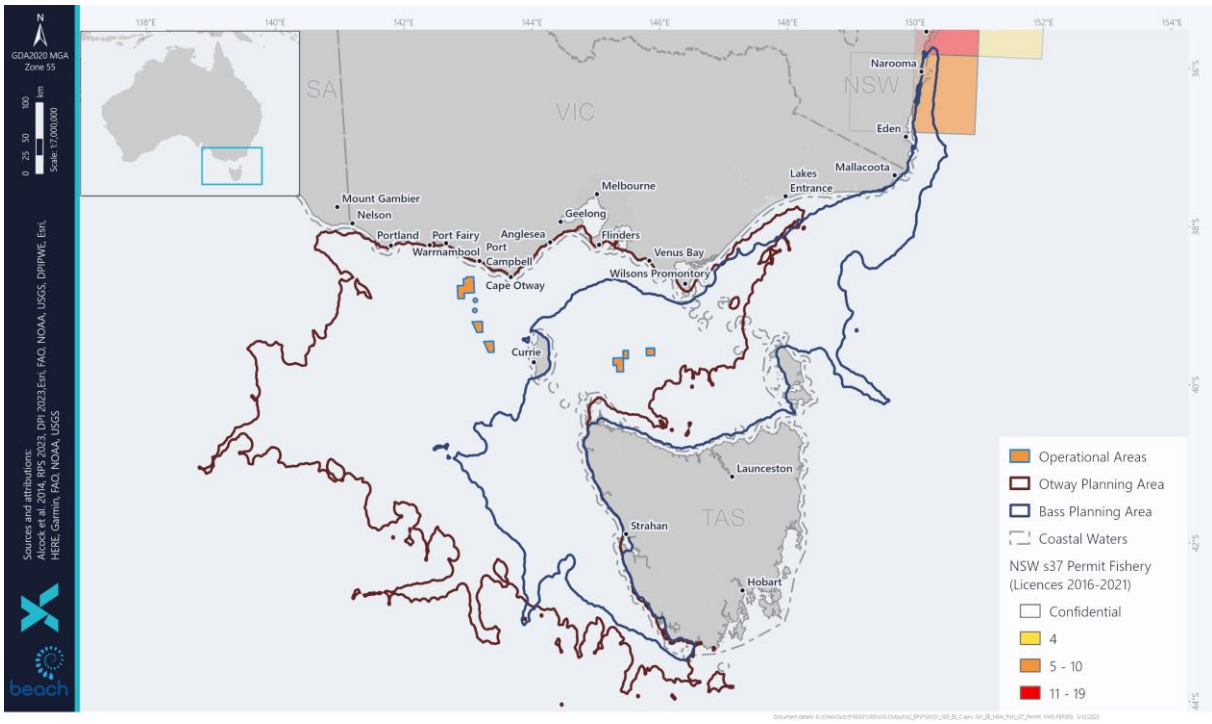


Figure 6-85: NSW s37 Fishery Number of Licences from 2016-2021. Data obtained from DPI 2023.

6.5.11 South Australian Managed Fisheries

South Australian state fisheries are managed by the Department of Primary Industries and Regions (DPIR) under the *Fisheries Management Act 2007*. DPIR jurisdiction covers all waters that are within the limits of the state with additional offshore constitutional settlements for specific fisheries beyond state

boundaries into Commonwealth waters. South Australian-managed commercial fisheries with access licences that authorise harvest in the Planning Areas are detailed below. Though certain fisheries possess jurisdiction to fish within the EMBA, analysis of publicly available and requested catch data indicates that not all fisheries have recently actively fished within the Planning Areas. Only fisheries with active fishing occurring in the Planning Areas in the last 10 years will be assessed further. South Australian managed fisheries active within the Planning Areas include:

- Charter Boat
- Giant Crab
- Marine Scalefish
- Rock Lobster

Information relating to the target species, fishing locations, landed catch, value and other relevant aspects of each fishery is included in Table 6-34.

Table 6-34: South Australia Managed Fisheries Commonwealth Managed Fisheries within the Planning Areas

Fishery	Target species	Description	Fishing Effort Operational Area		Fishing Effort Planning Area	
			Bass	Otway	Bass	Otway
Charter Boat Fishery	Various	The Charter Boat Fishery is a limited entry fishery with 82 licence holders of which 47 were active in 2020/2021. Fishing in inshore regions where water depths are <50 m is the most frequent activity. Peak periods are between December and April (summer) and October (Figure 6-86).	No	No	Yes	Yes
Giant Crab Fishery	Giant Crab	Information from in this section is from McLeay (2022) Giant Crab (*Pseudocarcinus gigas*), also known as King Crab, is endemic to southern Australian waters and distributed from southern Western Australia to central New South Wales. While they occur at depths ranging from 20 to 600 m, the highest population densities are found at the edge of the continental shelf at depths of approximately 140 to 270 m. Fishers use a maximum of 100 steel-framed pots that must comply with pot dimension specifications. Commercial access to the Giant Crab resource is limited to licence holders in the Miscellaneous Fishery and Rock Lobster Fishery. Total allowable catch in the fishery is 22.1 t per year, consisting of 13.4 t in the Northern Zone and 8.7 t in the Southern Zone, with total catch ranging from 15.4 t in 202/21 to 18.4 t in 2017/218. The Giant Crab fishing season in between 1 October 31 May, with the fishing season in the Southern Zone between 1 October and 30 April, and in the Northern Zone between 1 November and 31 May. The Otway Planning Area overlaps the southern zone of the fishery, however, DPIR could not provide data specific to the area as all data for the Giant Crab Fishery is confidential (Figure 6-87).	No	No	No	Yes
Marine Scalefish Fishery	King George Whiting	Information from in this section is from Smart et al. (2022). The Marine Scalefish Fishery is a multi-species and multi-gear fishery. Commercial fishing can be undertaken for more than 60 species of scalefish using a range of gear types. The Sardine Fishery is a part of the Marine Scalefish Fishery. The Marine Scalefish Fishery operates in all coastal waters of South Australia between the Western Australian and Victorian border. For some species the Offshore	No	No	No	Yes

Fishery	Target species	Description	Fishing Effort Operational Area		Fishing Effort Planning Area	
			Bass	Otway	Bass	Otway
		Constitutional Settlement extends the fishery area out 200 nm to the Australian Exclusive Economic Zone miles. The fishing area includes gulfs, bays and estuaries, excluding the Coorong. The main species taken are: • King George Whiting • Southern Garfish • Southern Calamari. Those 4 species make up: • 60% of the total fishery production weight • 70% of the total fishery value. Not all species taken by this fishery are scalefish. Other species include squid, worms, sharks. In 2020 there were >300 licences in the fishery. Total annual catches of primary species decline from 2,089 t in 2001 to 807 t in 2020. The Otway Planning Area overlaps the fishery where there have been 27 active licences issued between 2012/21 (Figure 6-88).				
Rock Lobster Fishery	Southern Rock Lobster	The information below is from Linnane et. al (2022). The Rock Lobster Fishery is based on the capture of Southern Rock Lobster (*Jasus edwardsii*). Other species are permitted to be landed and sold, including Giant Crabs and octopus. Rock lobsters are commercially harvested with pots that are set overnight. Rock lobster licence holders may also harvest marine scalefish as endorsed on their licence. The Otway Planning Area overlaps the fishery where there have been 92 active licences issued between 2012/21 and which is closed from 31 May to 1 October (Figure 6-89). The total reported 2020 logbook catch was 1,275.5 t (99% of TACC). The annual catch within the Planning Area ranged from 331 t to 420 t from 2012 to 2022. During this period licence holders ranged from 43 to 71.	No	No	No	Yes

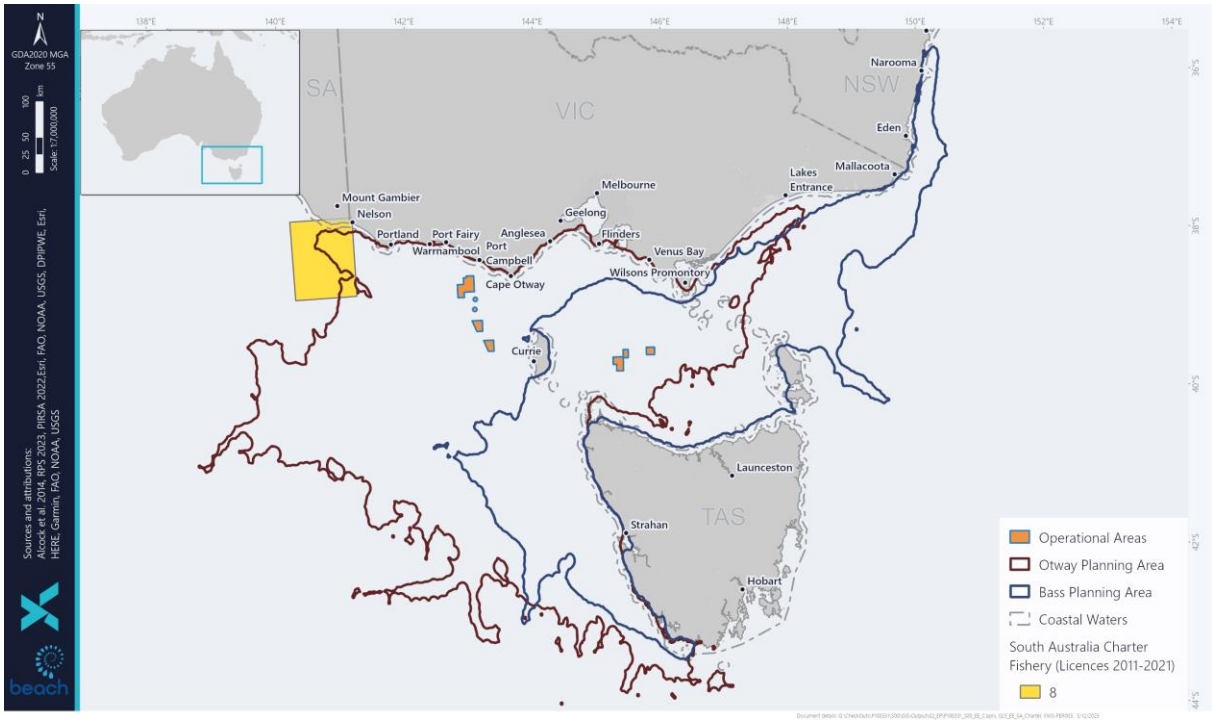


Figure 6-86: SA Charter Fishery Number of Licences from 2011-2021. Data obtained from PIRSA 2022.

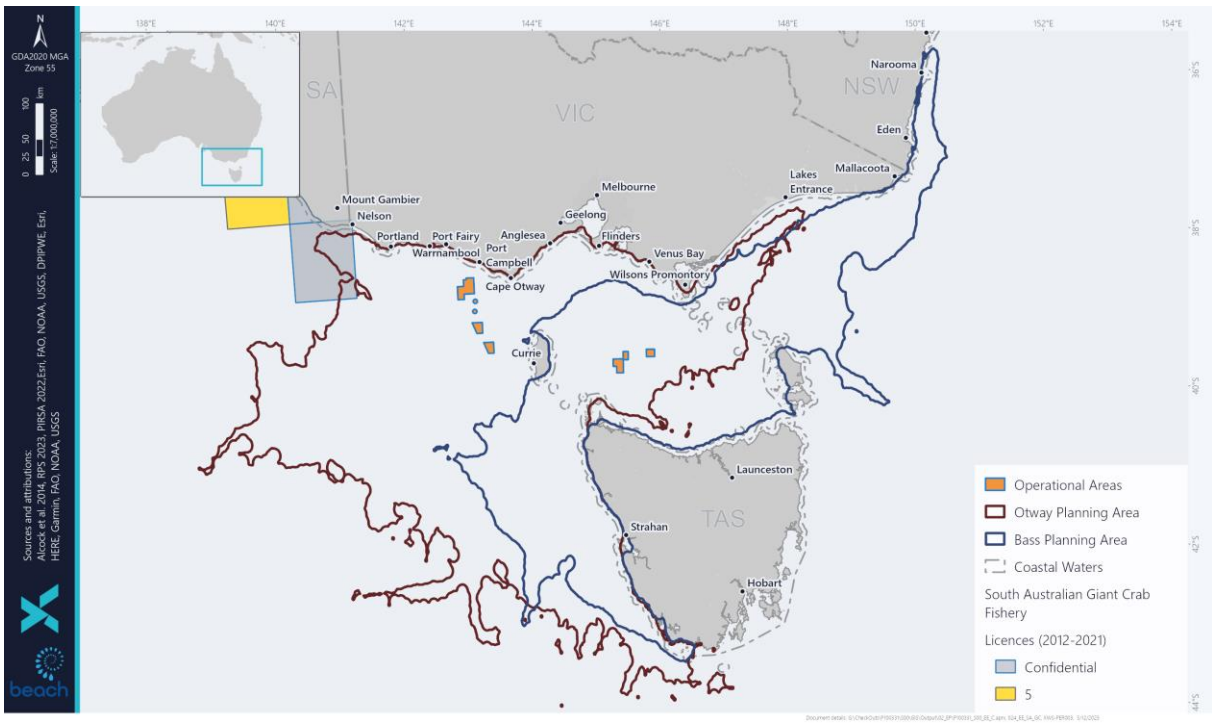


Figure 6-87: SA Giant Crab Fishery Number of Licences from 2012-2021. Data obtained from PIRSA 2022.

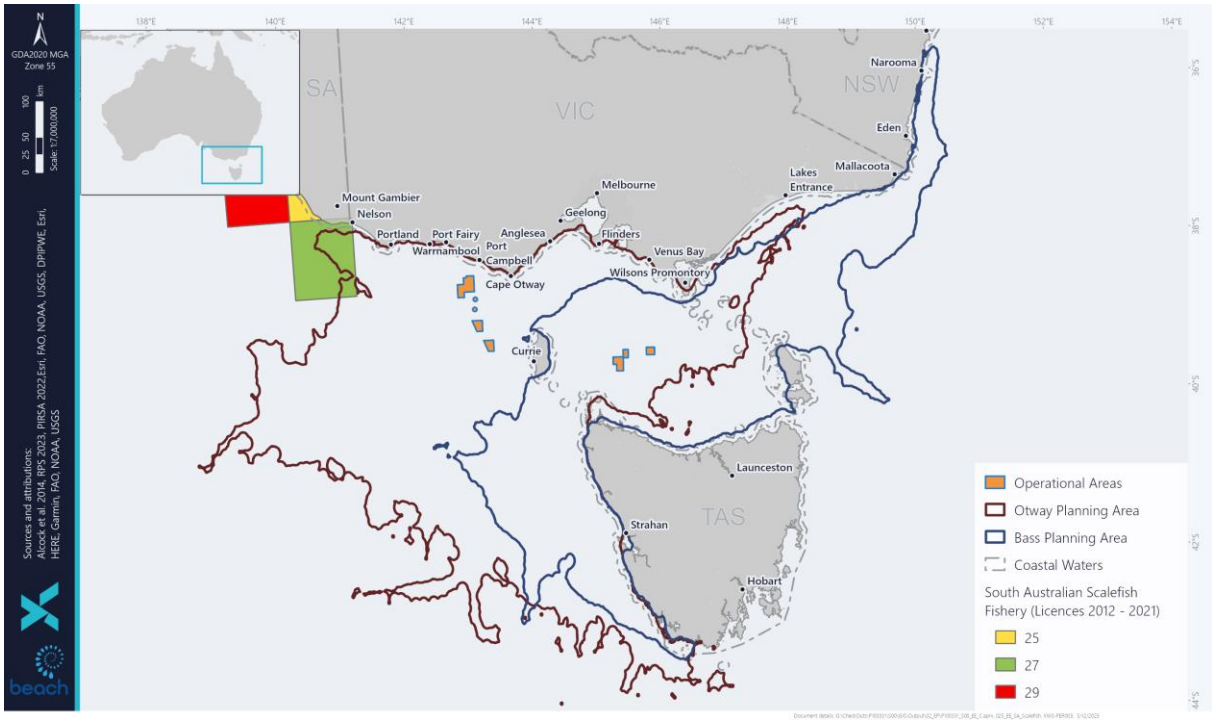


Figure 6-88: SA Scalefish Fishery Number of Licences from 2012-2021. Data obtained from PIRSA 2022.

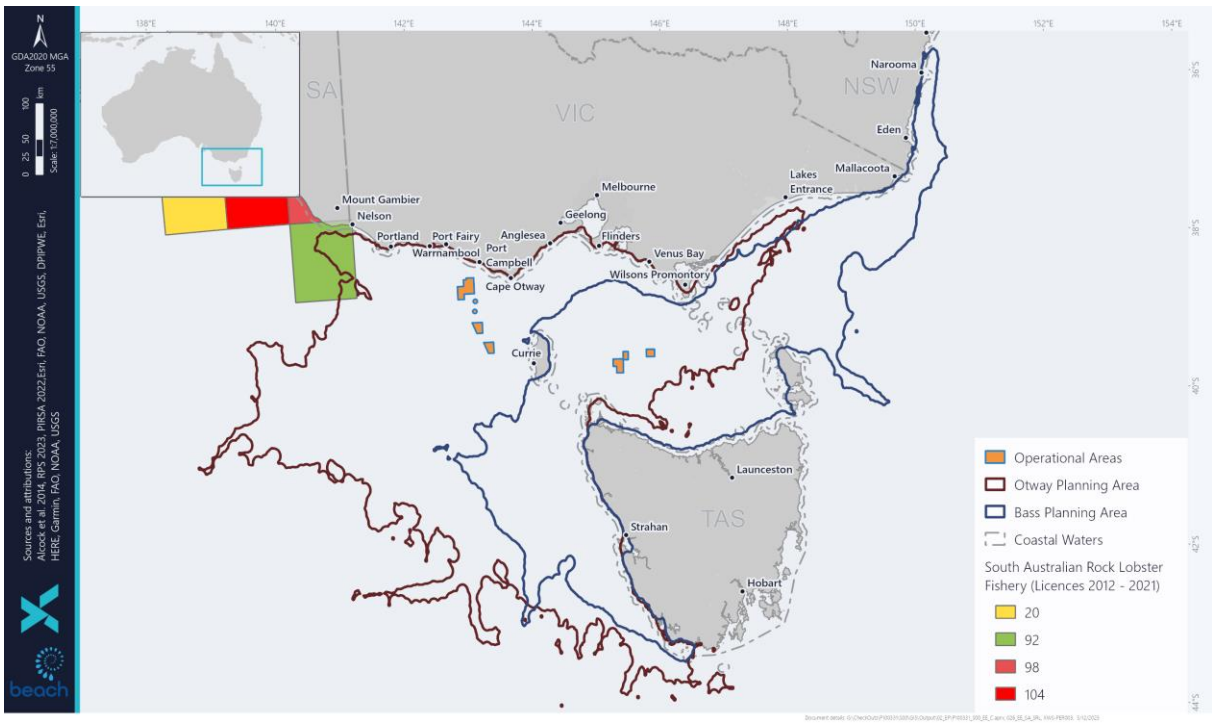


Figure 6-89: SA Southern Rock Lobster Fishery Number of Licences from 2012-2021. Data obtained from PIRSA 2022.

6.5.12 Tasmanian Managed Fisheries

Fishing Tasmania manages Tasmania's commercial fisheries under the Living Marine Resources Management Act 1995.

All fisheries except for the Giant Crab Fishery and the Rock Lobster Fishery operate within Tasmanian waters. The Giant Crab Fishery and the Rock Lobster Fishery also operate in Commonwealth waters under an Offshore Constitutional Settlement (OCS) between the Australian Government and the Government of Tasmania.

No Tasmanian fisheries occur within the Operational Areas.

There are eight Tasmanian state managed commercial fisheries that potentially occur within the Planning Areas:

- Abalone Fishery
- Commercial Dive Fishery
- Giant Crab Fishery
- Marine Plant Fishery
- Rock Lobster Fishery
- Scalefish Fishery
- Scallop Fishery
- Shellfish Fishery

Information relating to the target species, fishing locations, landed catch, value and other relevant aspects of each fishery is detailed in Table 6-35. Data and information sources are Department of Natural Resources and Environment Tasmania (DNRET 2022), Department of Primary Industries, Water and Environment (DPIPWE 2021), Australian fisheries and aquaculture statistics 2014-15 (Patterson et al. 2022).

Maps are also provided showing where the number of vessels reported in a Tasmanian Fishery grid between 2011 – 2021 in relation to the Operational and/or Planning Areas. Fishing effort data is confidential if a grid has five or less active vessels. No data on the Abalone Fishery locations was available from Fishing Tasmania due to the confidential nature of the data.

The Rock Lobster and Abalone Fisheries, which are by far the most productive and economically important Tasmanian fisheries accounting for 95% of the total value, are both expected to be active within the Planning Areas. Commercial Dive, Giant Crab, Scalefish, Scallop, Seaweed and Shellfish Fisheries are also likely to be active within the Planning Areas to varying degrees.

Table 6-35: Tasmanian Managed Fisheries in the Planning Area

Fishery	Target species	Description	Fishing Effort Operational Area		Fishing Effort Planning Area	
			Bass	Otway	Bass	Otway
Abalone Fishery (Northern and Bass Strait Zones)	Black lip (*Haliotis rubra*) and greenlip abalone (*H. laevigata*)	Largest wild abalone fishery in the world (providing ~25% of global production) and a major contributor to the local economy. Abalone are hand-captured by divers in depths between 5-30 m. Blacklip abalone are collected around on rocky substrate around the Tasmanian shoreline and are the main focus of the fishery. Greenlip abalone are distributed along the north coast and around the Bass Strait islands and usually account for around 5% of the total wild harvest. In 2020/21, the gross value of production of the fishery was around $50 million from a total catch of approximately 1,000 tonnes. The jurisdictional area of the Abalone Fishery is Tasmanian State waters. The Bass and Otway Planning Areas intersect the Northern Zone (waters around King Island), Bass Strait Zone (waters in the Northern Bass Strait Region) and Western Zone (waters along the western Tasmanian coast) of the Abalone Fishery (Figure 6-90).	No	No	Yes	Yes
Commercial Dive Fishery (Northern Zone)	Shortspined sea urchin (*Heliocidaris erythrogramma*) Wavy periwinkles (*Lunella undulata*) Longspined sea urchin (*Centrostephanus rodgersii*)	Dive capture fishery that targets several different species; the main species collected being sea urchins and periwinkles. In 2020-2021 approximately 180 t of sea urchins and 2.07 t of periwinkles were harvested. Sea urchins and periwinkles accounting for 63% and 37% of the total respectively. Jurisdiction encompasses all Tasmanian State waters (excluding protected and research areas), although licence holders largely operate out of small vessels (<10 m) and effort is concentrated on the south and east costs of Tasmania around ports. The Bass and Otway Planning Areas overlap the Northern Zone of the Commercial Dive Fishery at King Island and in the northern Bass Strait and the Western Zone along the western Tasmanian coast (Figure 6-90). The Northern Zone of the fishery is defined as the area of Tasmanian State waters on the east coast bounded by the line of latitude 42°20'40"S in the south and extending north to the line of latitude 41°00'26"S (from the southern point of Cape Sonnerat to Red Rocks). The Western Zone of the fishery is defined as the area of Tasmanian State waters on the west coast bounded in the south by Whale Head near South East Cape and bounded in the north by Bluff Point.	No	No	Yes	Yes
Giant Crab Fishery	Giant crab (*Pseudocarcinus gigas*)	The giant crab fishery is a comparatively small fishery with the annual harvest set at 20.7 tonnes but with a high landed value of around $2 million. The fishery has been commercially targeted since the early 1990s, moving from open access to limited entry. The area of the fishery includes waters surrounding the state of Tasmania generally south of 39º12 out to 200 nm. Within the area of the fishery, most effort takes place on the edge of the continental slope in water depths between 140 m and 270 m. CPUE has declined continually since the inception of the fishery in the early 1990s indicating that it has been overfished. The TAC has been reduced to 20.7 t for 2019/120 and 2021/2022 to address the issue. Figure 6-91 shows the Bass and Otway Planning Areas overlap where giant crabs are fished, particularly along the continental slope. The Operational Areas do not overlap reported areas of fishing for giant crabs.	No	No	Yes	Yes
Marine Plant Fishery	Bull kelp (*Durvillea Pototorum*) Japanese kelp (*Undaria pinnatifida*)	Marine plants include kelp, seaweed, seagrasses, and algae which are food and habitat for other marine species. To protect Tasmanian marine ecosystems, no marine plants may be harvested directly from the water, except in the Undaria fishery. The majority of cast bull kelp is collected from King Island. The right to harvest and process kelp on King Island was granted exclusively to Kelp Industries Pty Ltd in the mid-1970s. About 80 to 100 individuals collect cast bull kelp and transport it to the Kelp Industries plant in Currie. An average annual harvest above 3000 t (dried weight) has been produced in recent years, accounting for about 5% of the world production of alginates (i.e. the end product of dried bull kelp). The cast bull kelp harvesting on King Island generates about $2 million annually. Comparatively minor cast bull kelp collection also occurs at two centres of operation on Tasmania's West Coast: around Bluff Hill Point and at Granville Harbour. Japanese kelp is harvested by divers only along Tasmania's east coast where it is already well established. The Planning Areas overlap where bull kelp is potentially collected from the King Island area and the North West area.	No	No	Yes	Yes
Rock Lobster Fishery	Southern rock lobster (*Jasus edwardsii*)	Southern rock lobster are the other major wild-caught Tasmanian fishery. For 2022-23 the Total Allowable Catch remains at 1050.7 t. Southern rock lobsters are found to depths of 150 m with most of the catch coming from inshore waters less than 100 m deep throughout state waters. The fishery is a limited entry with 312 licences. The Bass and Otway Planning Areas overlap fishing effort for the Rock Lobster Fishery (Figure 6-92). Figure 6-92 shows some overlap with grids with fishing effort for the Rock Lobster Fishery for the Otway and Bass Operational Areas, however, further analysis did not identify any fishing effort within these areas (SETFIA 2023).	No	No	Yes	Yes
Scalefish Fishery (northwest coast)	Multi-species and multi-gear fishery	Complex multi-species fishery harvesting a range of scalefish, shark and cephalopod species. Fourteen different fishing methods are used. Highest commercial catches in 2019/20 were reported for Southern Calamari (85.8 t), Wrasse (52.4 t), and Eastern School Whiting (43.7 t). Due to the fishery being under caught by 26.7% in the previous season 2020/21, the Total Allowable Catch for the 2021/22 season has increased to 30 kg quota unit. The Planning Areas overlap the Scalefish Fishery management area (Figure 6-93).	No	No	Yes	Yes

Fishery	Target species	Description	Fishing Effort Operational Area		Fishing Effort Planning Area	
			Bass	Otway	Bass	Otway
Shellfish Fishery	Katelysia cockles (*Katelysia scalarina*) Venerupis clam (*Venerupis largillierti*) Native oyster (*Ostrea angasi*) Pacific oyster (*Crassostrea gigas*)	Comprises specific shellfish species hand captured by divers in defined locations on the east coast of Tasmania, namely Angasi oysters in Georges Bay, Venerupis clams in Georges Bay and Katelysia cockles in Ansons Bay. The taking of Pacific oysters, an invasive species, is also managed as part of the fishery but no zones apply. Pacific oysters can be collected throughout all State waters (which includes areas within the Planning Area), as the aim of harvesting these animals is to deplete the wild population. The estimated total value of the shellfish fishery based on landings from 2001-2005 was $345,538. The Planning Areas could potentially overlap areas where Pacific oysters are collected. Data for this fishery is confidential.	No	No	Yes	Yes

Data/information sources: Department of Primary Industries, Water and Environment (DPIPWE, 2021), Australian fisheries and aquaculture statistics 2014-15 (Patterson et al, 2022), Department of the Environment and Energy (DoEE, 2017c), Fish Research and Development Corporation (FRDC, 2017), Fishing Tasmania Website 2023.

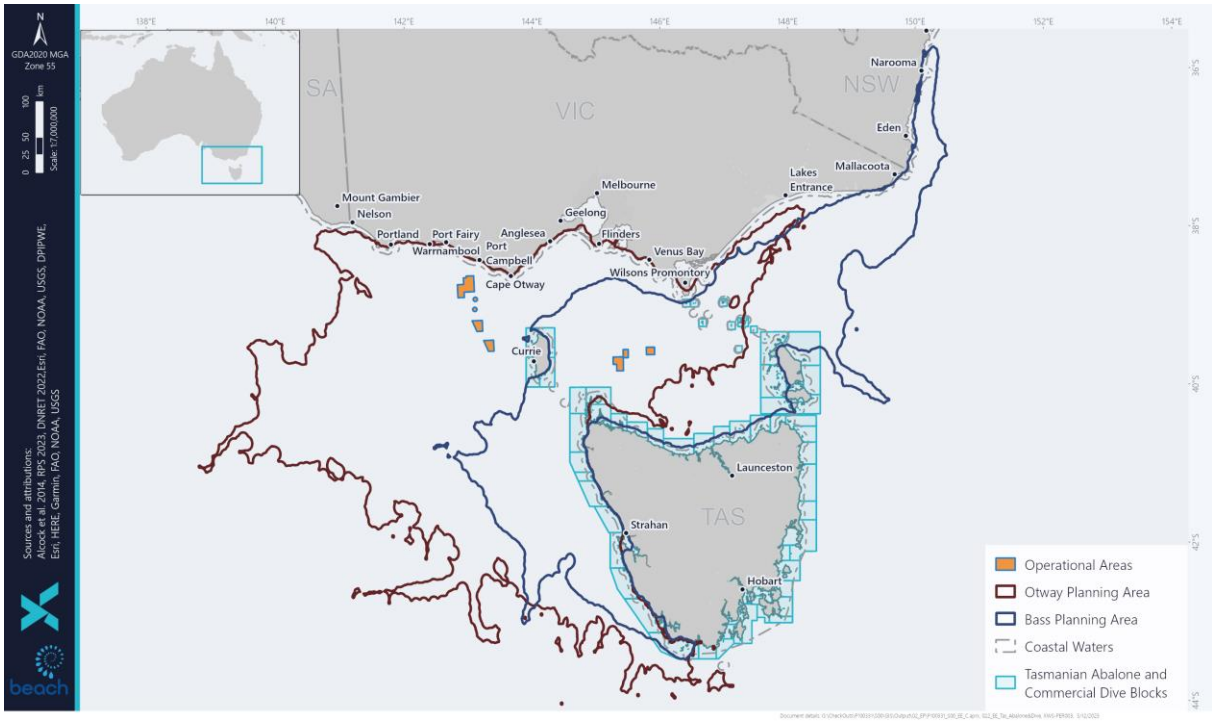


Figure 6-90: Tasmanian Abalone and Commercial Dive Blocks. Data obtained from DNRET 2022.

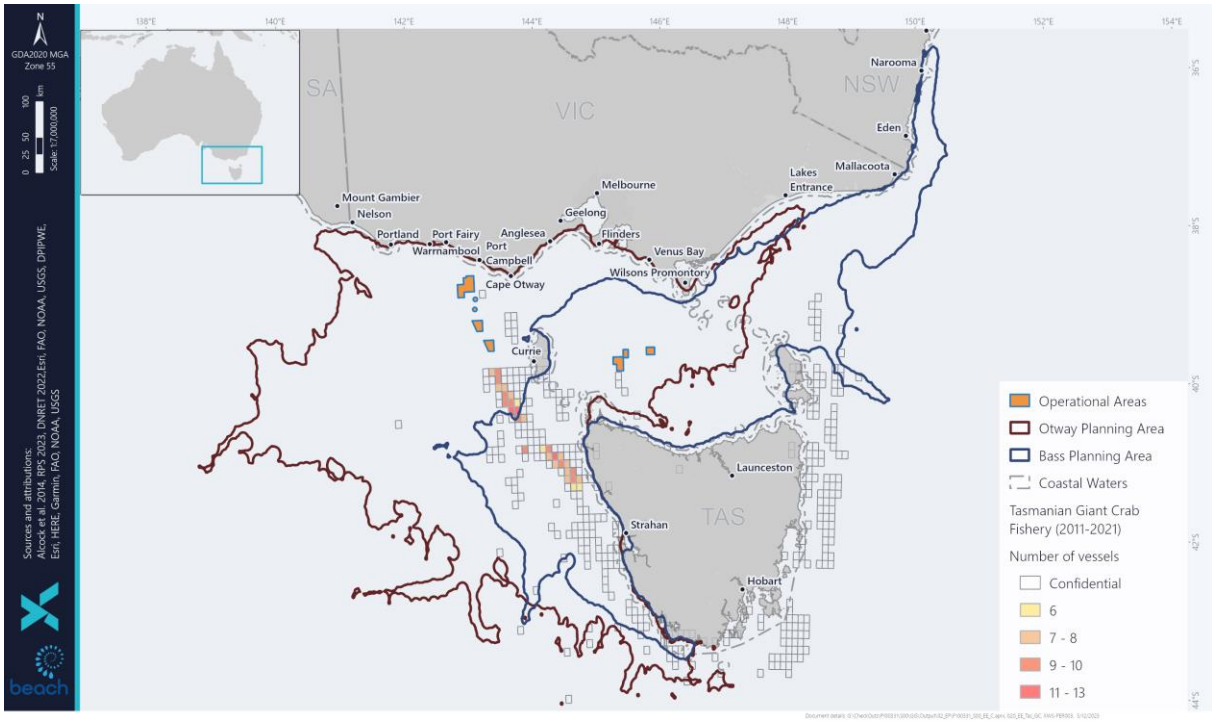


Figure 6-91: Tasmanian Giant Crab Fishery Number of Vessels from 2011 to 2021. Data obtained from DNRET 2022.

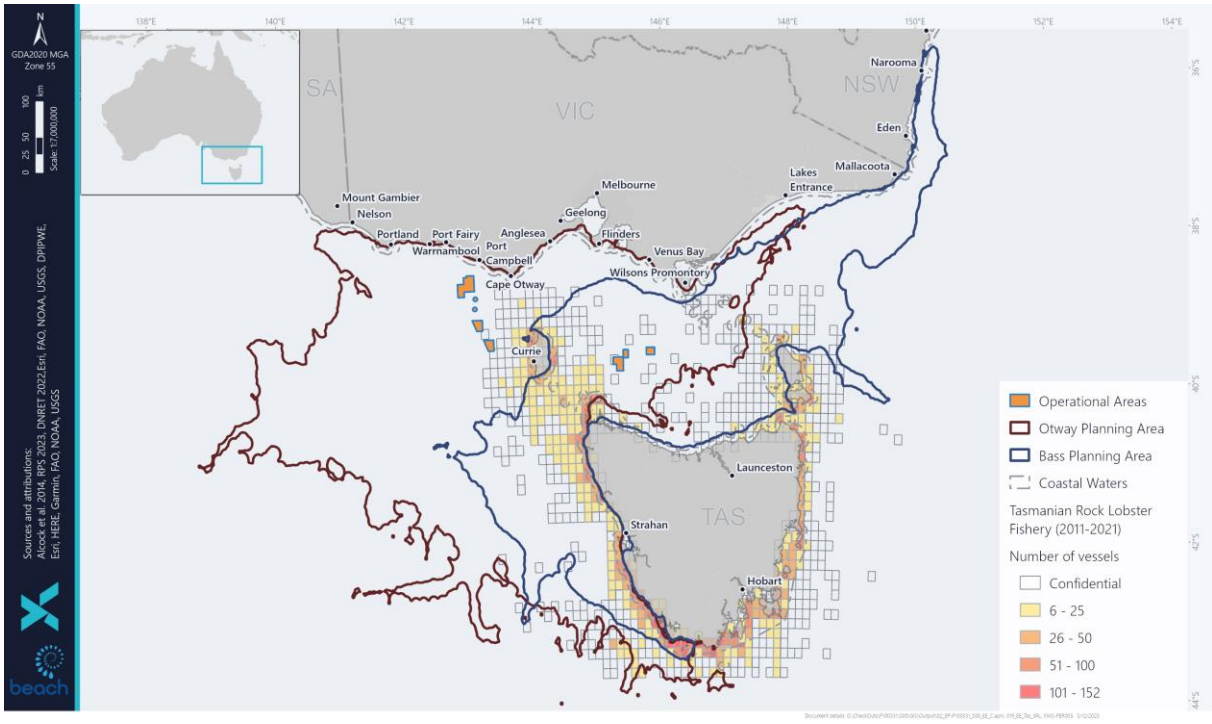


Figure 6-92: Tasmanian Rock Lobster Fishery Number of Vessels from 2011 to 2021. Data obtained from DNRET 2022.

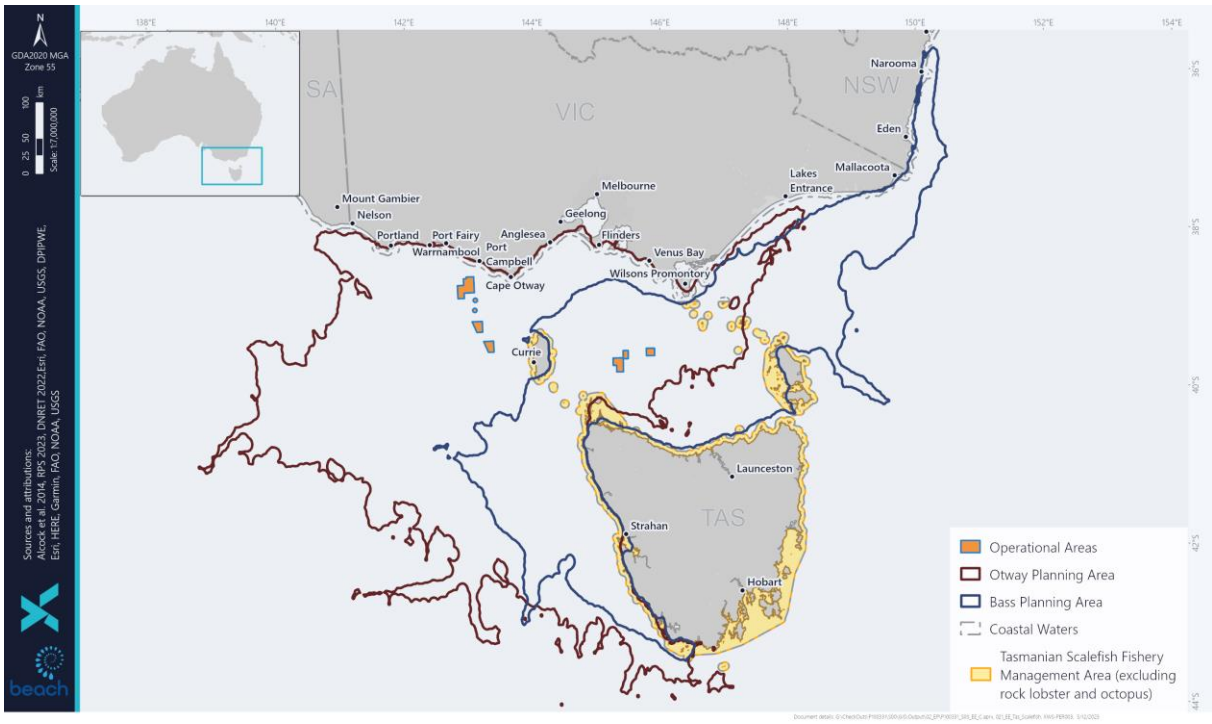


Figure 6-93: Tasmanian Scalefish Fishery Management Area. Data obtained from DNRET 2022.

6.5.13 Victorian Managed Fisheries

Victorian fisheries are managed by the Victorian Fisheries Authority (VFA) under the Fisheries Act 1995 (Cth). VFA has regulatory responsibility for the management of fisheries in Victorian State Waters out to 3 nm and Commonwealth waters where the VFA manage fisheries on behalf of the Commonwealth

under the Offshore Constitutional Settlement (OCS) arrangements. OCS arrangements are joint management arrangements of particular marine living resources that are found in waters subject to both Commonwealth and State control. Such arrangements allow for the management of the resources by State authorities, even in waters outside the State 3 nm territorial sea boundary. In Victoria, such arrangements are in place out to 20 nm for key species such as scallop and rock lobster.

There are six Victorian state-managed fisheries that overlap the Operational and/or Planning Areas:

- Abalone Fishery
- Giant Crab Fishery
- Multi-species Ocean Fisheries
- Octopus Fishery
- Pipi Fishery
- Rock Lobster Fishery
- Scallop (Ocean) Fishery
- Wrasse (Ocean) Fishery

Information relating to the target species, fishing locations, landed catch, value and other relevant aspects of each fishery is provided in Table 6-36. Maps are also provided showing where the number of vessels reported in a VFA grid between 2011–2021 in relation to the Operational and/or Planning Areas. Fishing effort data is confidential if a grid has less than five active vessels. No data on the Abalone Fishery locations was available from VFA due to the confidential nature of the data.

Data sources are from the Victorian Fisheries Authority Commercial Fish Production Information Bulletin July 2020 to June 2021 (VFA 2021) and VFA website (VFA 2023a) unless indicated.

Table 6-36: Victorian Managed Fisheries in the Planning Area

Fishery	Target species	Description	Fishing Effort Operational Area		Fishing Effort Planning Area	
			Bass	Otway	Bass	Otway
Abalone Fishery (western zone)	Blacklip abalone Greenlip abalone	A highly valuable fishery (A$16.8 million in 2020-21) that operates along most of the Victorian shoreline, generally to 30 m depth. Abalone are harvested by divers. Total allowable commercial catch limits of blacklip abalone for the western zone are considerably less than the central and eastern zone (for 2019-20 season, 73.2 tonnes compared with 294.5 and 34.5 tonnes, respectively). There are 14 licences in the western zone and 34 licences in the central zone. The water depths where abalone are fished are close to shore within the Planning Areas. No fishing effort was identified in the Operational Areas.	No	No	Yes	Yes
Giant Crab Fishery	Giant crab	A small fishery operating in western Victoria and closely linked with the Rock Lobster Fishery. Most vessels are used primarily for rock lobster fishing with giant crab taken as by-product. Fishing effort is concentrated on continental shelf edge (~200 m deep). Giant crabs inhabit the continental slope at approximately 200 m depth and are most abundant along the narrow band of the shelf edge. Closed seasons operate for male (15 September to 15 November) and female (1 June to 15 November) giant crabs. Total landed catch in 2015-16 was 10 tonnes. Data for 2020/21 is not available due to insufficient data to report because there are less than five licence holders (policy requirement to protect commercial confidentiality of data. Figure 6-94 shows overlap of giant crab fished areas with the Otway Operational and Planning Areas. The Otway Operational Area contains areas with up to 15 vessels fishing. The Bass Operational and Planning Areas do not overlap giant crab fished areas. Catch effort data is considered confidential if there are less than five vessels present.	No	Yes	No	Yes
Multispecies Ocean Fisheries – Inshore Trawl	Eastern king prawn School prawn Shovelnose lobster/Balmain bug Minor bycatch of school whiting	The fishery operates along the entire Victorian coastline, excluding marine reserves, bays and inlets. Most operators are based at Lakes Entrance. Otter-board trawls with no more than a maximum head- line length of 33 m, or single mesh nets are used. As of June 2019, there were 54 fishery access licences, with only about 15 active to various degrees. Figure 6-95 shows the Bass and Otway Planning Areas overlap areas with up to 10 vessels fishing. No fishing was identified within the Operational Areas. Catch effort data is considered confidential if there are less than five vessels present.	No	No	Yes	Yes
Multispecies Ocean Fisheries – Ocean General Fishery	Gummy shark School shark Australian salmon Snapper Small flathead bycatch	The wrasse, inshore trawl, southern rock lobster and giant crab fisheries are able to catch gummy shark and school sharks as part of their fishery. Snapper are caught using lines, nets and haul seine. Over 90% of the catch is from Port Phillip Bay, and around 5% from coastal waters. In 2020/21, 45 tonnes were landed but a values could not be provided as there is insufficient data to report because there are less than five licence holders (policy requirement to protect commercial confidentiality of data). Figure 6-96 shows both Bass and Otway Planning Areas overlap areas fished, with some areas containing up to 88 vessels fishing. Catch effort data is considered confidential if there are less than five vessels present. No fishing effort was reported within the Operational Areas.	No	No	Yes	Yes
Octopus Fishery	Pale octopus Maori octopus Gloomy octopus	The octopus fishery (Eastern Zone) is a new fishery harvesting mainly pale octopus (*Octopus pallidus*) in East Gippsland. The fishery may also catch Maori octopus (*Macroctopus maorum*) and gloomy octopus (*Octopus tetricus*). Octopus are caught using purpose-built unbaited traps. The fishery commenced on 1st August 2020. Three fishery locations have been established for this new fishery; Eastern, Central and Western octopus zones. The Eastern zone is where the majority of commercial octopus takes place with the Central and Western zones are less established but are being managed by VFA through exploratory, temporary permits. Figure 6-97 shows that octopus fishing effort overlaps both Bass and Otway Planning Areas, with some areas containing up to 10 vessels fishing. Catch effort data is considered confidential if there are less than five vessels present. No fishing effort was reported within the Operational Areas.	No	No	Yes	Yes
Pipi Fishery	Pipi	Main commercial harvesting area is Discovery Bay with limited activity in Venus Bay. Harvested in the high impact beach zone using traditional dip nets. Figure 6-98 shows that the Otway Planning Area overlaps a small area where pipi fishing occurs where catch effort data is considered confidential due to less than five vessels being present. No fishing effort was reported within the Operational Areas or Bass Planning Area.	No	No	No	Yes
Rock Lobster Fishery (western and eastern zone)	Southern rock lobster	Victoria's second most valuable fishery with a production value of A$13.6 million in 2020/21. Since 2009/10, annual quotas have been set at between 230 and 260 tonnes and have been fully caught each year. In the western zone, most catch is landed through Portland, Port Fairy, Warrnambool, Port Campbell and Apollo Bay. Closed seasons operate for male (15 September to 15 November) and female (1 June to 15 November) lobsters. Southern rock lobsters are found to depths of 150 m, with most of the catch coming from inshore waters less than 100 m deep. Figure 6-99 shows the Otway Operational Areas and both Bass and Otway Planning Areas overlap the southern rock lobster fished areas. The Otway Operational Area overlap areas with up to 24 vessels fishing while the Otway Planning Area contains areas with as many as 117 vessels fishing. The Bass Planning Area overlaps only small areas with up to 24 vessels fishing. No fishing was reported within the Bass Operational Area.	No	Yes	Yes	Yes

Fishery	Target species	Description	Fishing Effort Operational Area		Fishing Effort Planning Area	
			Bass	Otway	Bass	Otway
Scallop (Ocean) Fishery	Scallop	Extends the length of the Victorian coastline from high tide mark to 20 nm offshore. Fishers use a scallop dredge. Temporary closures occur when stocks are low to allow scallop beds to recover. Total allowable commercial catch for 2015-16 was set at 135 tonnes. Scallops are mostly fished from Lakes Entrance and Welshpool. Figure 6-100 shows no overlap of the fished areas within the Operational Areas and a small overlap of the Bass and Otway Planning Areas along Gippsland. The Bass Planning Area overlaps small areas where catch effort data is considered confidential due to less than five vessels being present and one area with up to six vessels fishing. The Otway Planning Area overlaps an area with up to 14 vessels fishing.	No	No	Yes	Yes
Wrasse (Ocean) Fishery	Bluethroat wrasse Purple wrasse Small catches of rosy wrasse, senator wrasse and southern Maori wrasse	Extends the length of the Victorian coastline from high tide mark to 20 nm offshore. Fishers mostly use hook and line. Limited entry fishery with 22 current licences. Total annual catch in 2019/20 was 21.5 tonnes. Figure 6-101 shows overlap of fished areas with the Bass and Otway Planning Areas. Fishing intensity for areas with less than five active vessels is considered confidential. No fishing effort was reported within the Operational Areas.	No	No	Yes	Yes

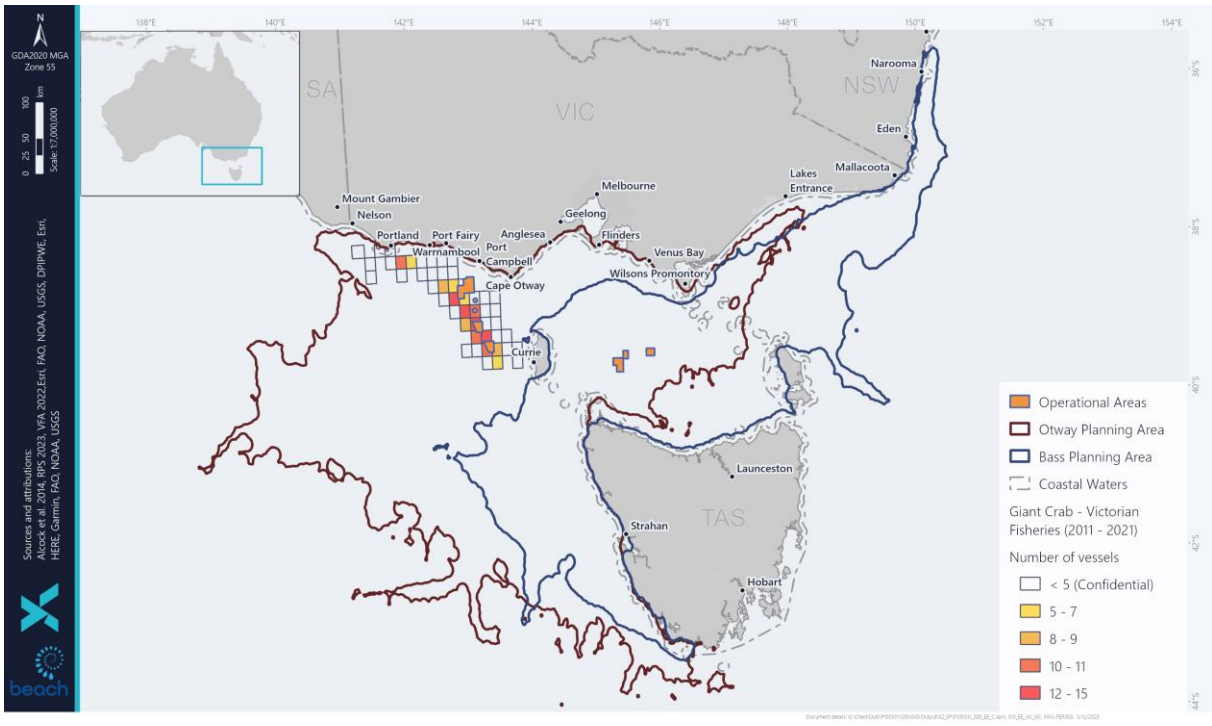


Figure 6-94: Victorian Giant Crab Fishery Number of Vessels from 2011-2021. Data obtained from VFA 2022.

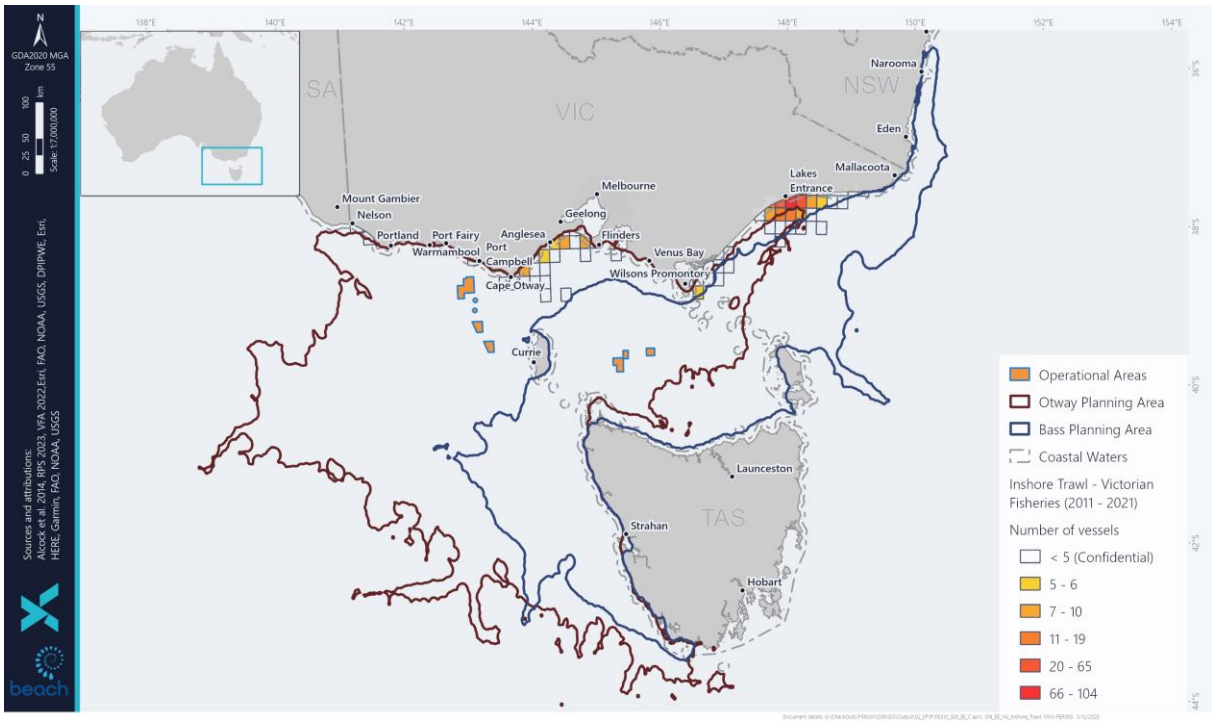


Figure 6-95: Victorian Multispecies Ocean Fisheries – Inshore Trawl Fishery Number of Vessels from 2011-2021. Data obtained from VFA 2022.

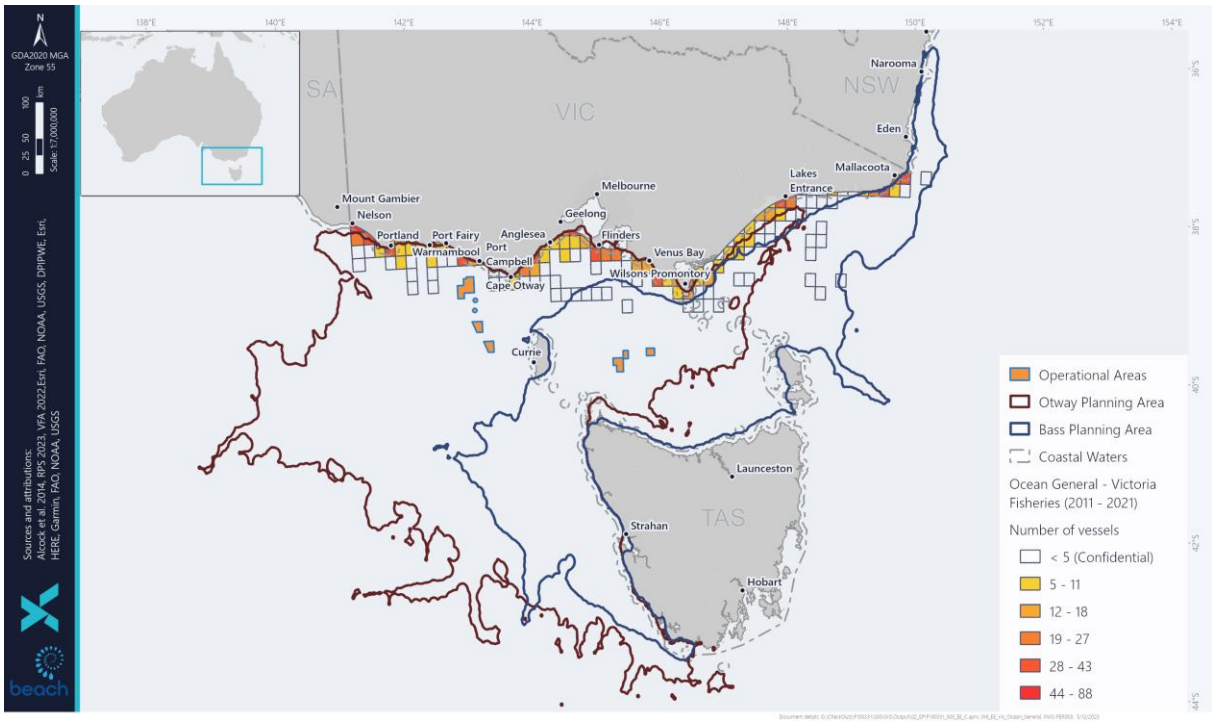


Figure 6-96: Victorian Multispecies Ocean Fisheries- Ocean General Fishery Number of Vessels from 2011-2021. Data obtained from VFA 2022.

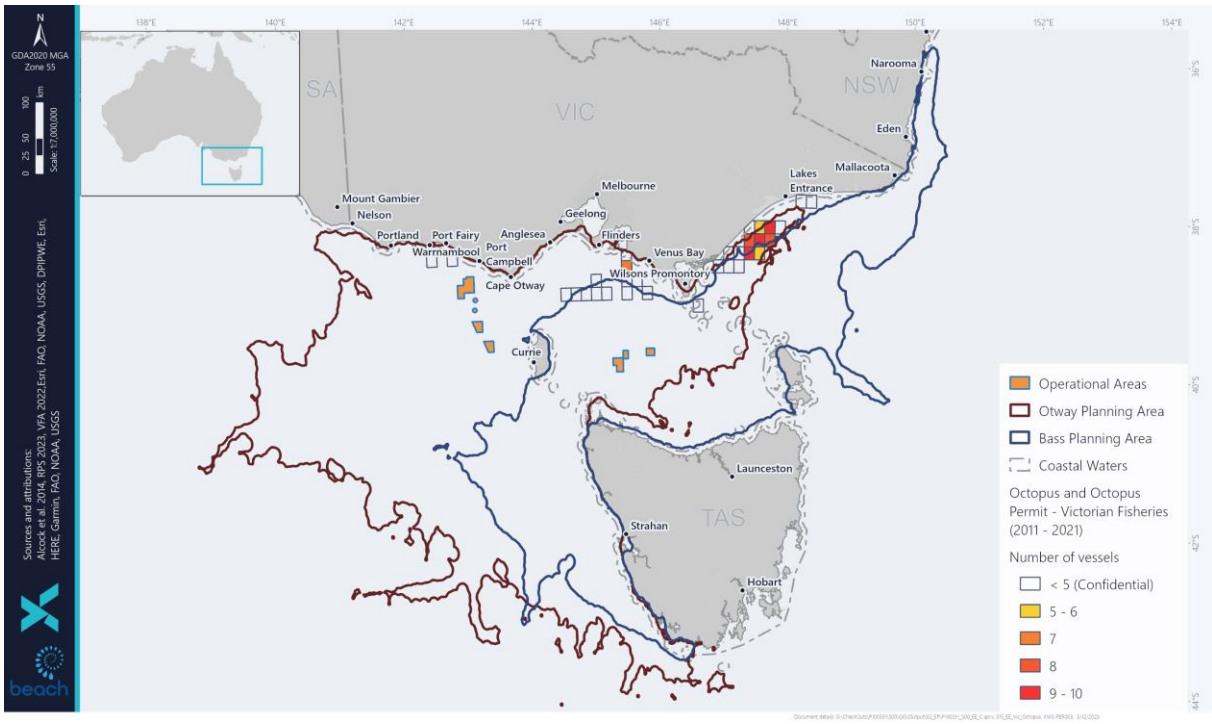


Figure 6-97: Victorian Octopus and Octopus Permit Fishery Number of Vessels from 2011-2021. Data obtained from VFA 2022.

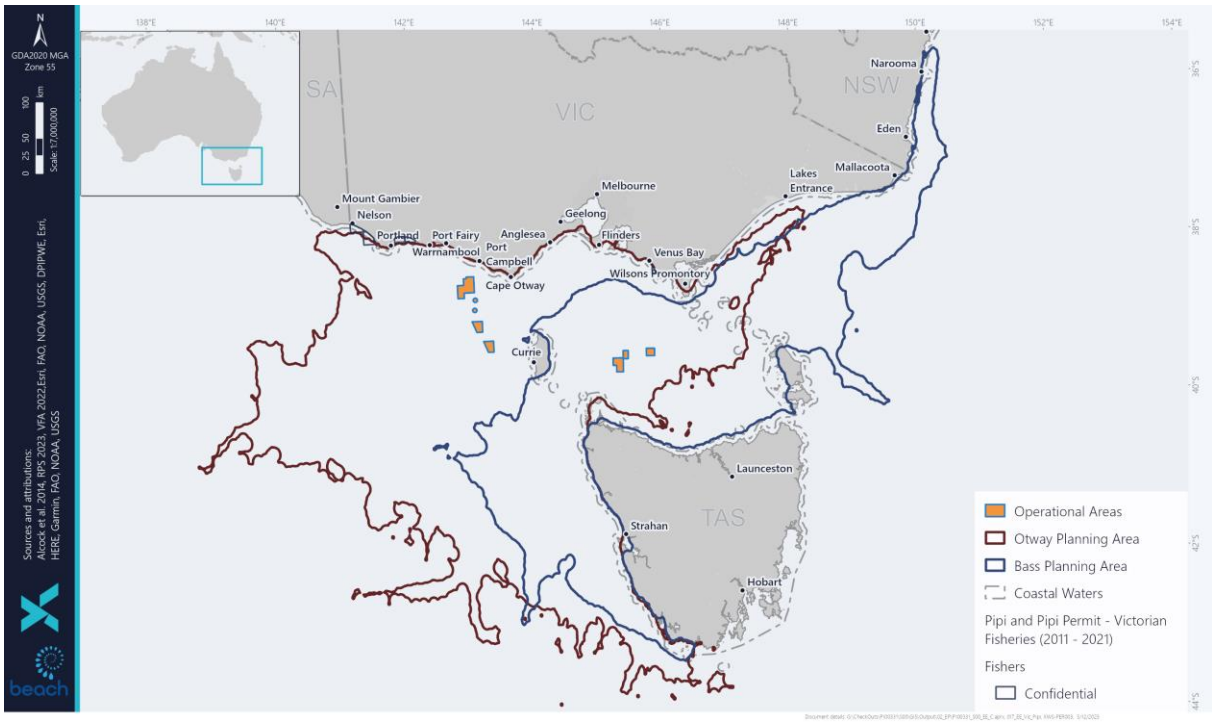


Figure 6-98: Victorian Pipi Fishery Number of Vessels from 2011-2021. Data obtained from VFA 2022.

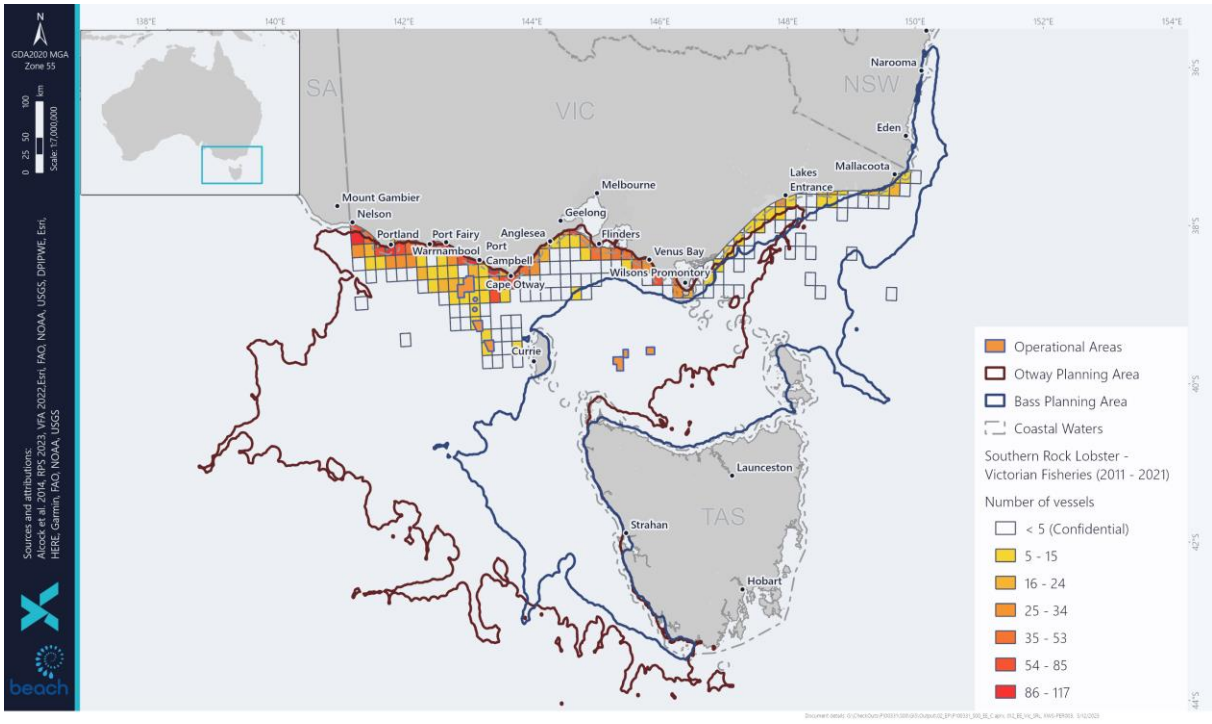


Figure 6-99: Victorian Southern Rock Lobster Fishery Number of Vessels from 2011-2021. Data obtained from VFA 2022.

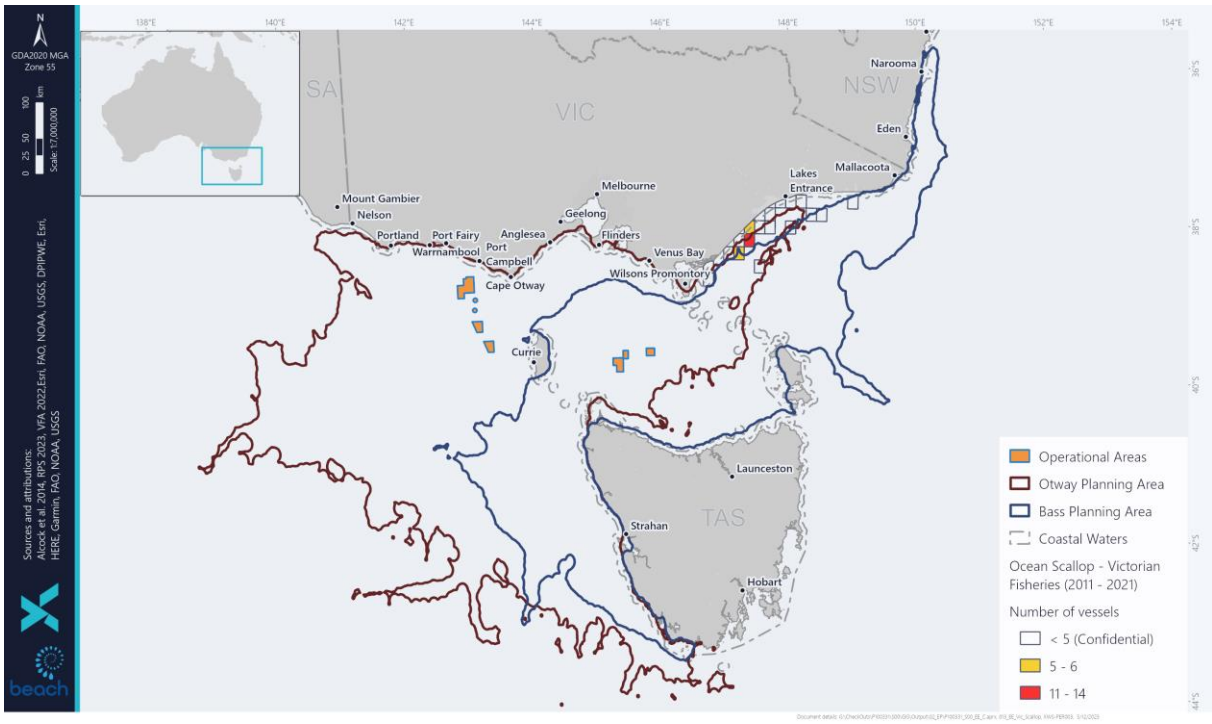


Figure 6-100: Victorian Scallop (Ocean) Fishery Number of Vessels from 2011-2021. Data obtained from VFA 2022.

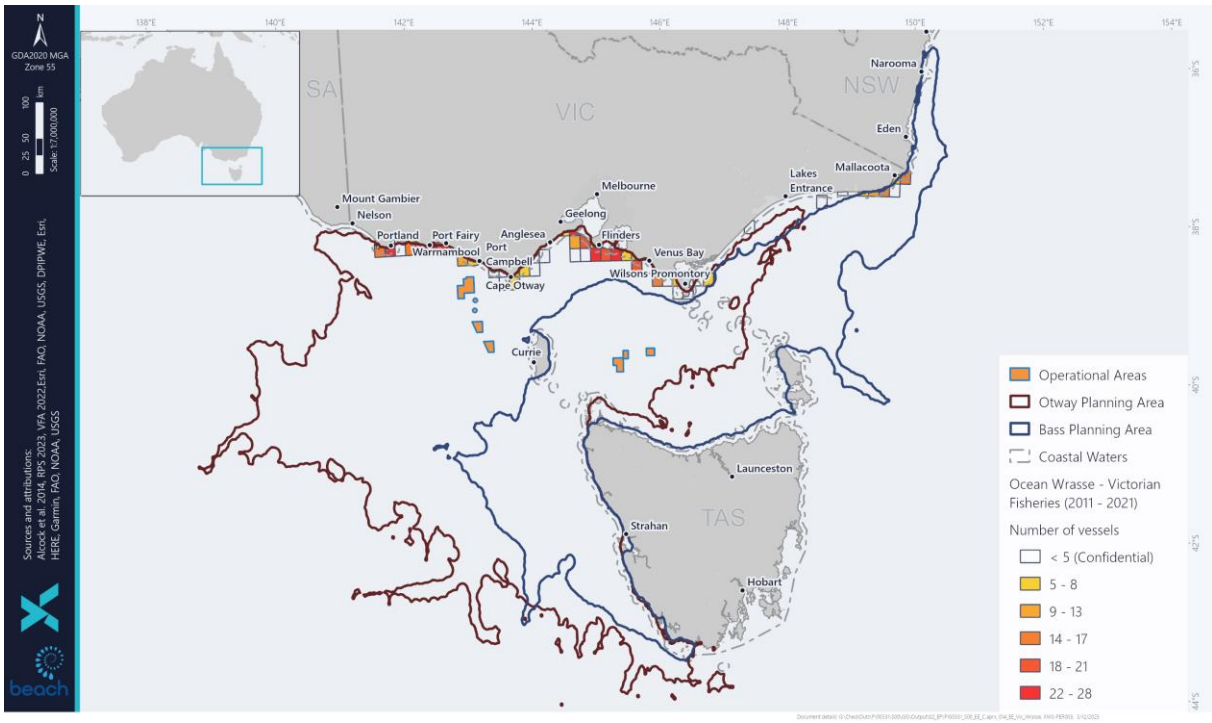


Figure 6-101: Victorian Wrasse (Ocean) Fishery Number of Vessels from 2011-2021. Data obtained from VFA 2022.

6.5.14 Seaweed Industry

The Australian seaweed industry is small: currently valued at an estimated gross value of product (GVP) of AUD $3 million. Of this, the majority is from one company, Kelp Industries Pty Ltd on King Island in Tasmania, who hand collect plants cast bull kelp (*Durvillea pototorum*) on the beaches from predominantly the west coast of the island, predominantly for export to a large alginate manufacturer and for use in biofertiliser products (Australian Seaweed Institute 2023). Australia Bureau of Statistics (ABS) data shows seaweed exports from Australia are valued at $1.5 million for non-human consumption and it is assumed that this is almost entirely from Kelp Industries exports.

Besides Kelp Industries, other seaweed collectors in Tasmania include Kelpomix and TasKelp. There are also licenses for wild harvest of the invasive species of Undaria in Tasmania (KaiHo Ocean Treasure) and some in Victoria (Australian Seaweed Institute 2023).

The harvesting of native seaweed in Victorian marine waters is prohibited without a permit (s. 112(2) Fisheries Act 1995) and licences enabling seaweed aquaculture are not currently available in Victoria (VFA 2023a).

While there are numerous research projects taking place or being planned, currently there are two projects in Tasmania (Australian Seaweed Institute 2023). The first, is a CRC-P project involving collaboration with Tassal, Spring Bay Seafoods and University of Tasmania (UTAS). This project aims to demonstrate the benefits of Kelps as part of an integrated multitrophic aquaculture approach. The second is a research collaboration between UTAS and Huon Aquaculture in Storm Bay that will also yield its first harvest in late 2020.

6.6 First Nations

6.6.1 Methodology to Identify Cultural Values and Sensitivities

The definition of environment in the OPGGS(E)R includes the people and communities, heritage value of places, and their social, economic, and cultural features. Specifically for First Nations peoples, this includes cultural heritage and sea country values which, in accordance with Indigenous tradition, may be a spiritual and cultural connections that may be affected by the activity.

Beach recognises First Nations Groups and their deep spiritual and cultural connection to the environment. The cultural values and features within the Operational and Planning Areas are addressed in this section.[1]

The description of the environment for cultural features and values was developed through:

- Consultation with First Nations groups with connection to Sea Country in the Operational and Planning Areas (Figure 6-103).
- Review of available publications by First Nations Groups relating to Sea Country.
- Engagement of Extent Heritage Pty Ltd (Extent), a specialist archaeological consulting firm, to undertake a literature review and review of Beach's assessment.

Through these processes, and in particular, consultation with First Nations Groups, Beach is confident we have identified the cultural heritage values, and cultural features and sensitivities of First Nations groups identified within the Operational and Planning Areas.

6.6.2 Recognition of First Nations Groups

First Nation Groups and Traditional Owners and connection to Country is recognised through contemporary laws such as the Commonwealth *Native Title Act (1993)*, as well as various State laws and agreement making (e.g. *Traditional Owner Settlement Act 2010* (Vic) and Aboriginal Heritage Acts).

While connection to Country for some First Nations Groups has been formally recognised through native title, other First Nations Groups and their connection and rights to land and sea is recognised through relevant State legislation.

A review of the statutory laws, rights and recognition conferred to First Nations Peoples within the Planning Areas is summarised in the below sections.

[1] In Australia, using 'Aboriginal and Torres Strait Islander peoples' is considered best practice and other terms such as 'First Nations' or 'First Peoples' are also acceptable language. The term Indigenous is sometimes used for formal programs, job titles or policies.
Throughout this document an effort has been made to keep terminology and First Nations group names consistent, however due to reference material including policies, legislations, and historical reports, at times terminology or names appear different, however all efforts have been made to ensure this is easy to follow.

6.6.2.1 Native Title

The Commonwealth *Native Title Act 1993* is an Australia-wide native title scheme with the following key objectives:

- Providing for the recognition and protection of native title.
- Establishing a mechanism for determining claims to native title.
- Establishing ways in which future dealings affecting native title (future acts) may proceed.

Native Title is the formal recognition that Aboriginal and Torres Strait Islander people have rights and interests to land and waters according to their traditional law and customs.

A key principle for native title determination is for First Nation's people to establish and prove that Indigenous people have an unbroken and current connection to their lands and waters and in practicing their culture from the time of European settlement.

Native title can be granted with non-exclusive or exclusive rights to lands and waters. Non-exclusive native title can include, for example, the right to live and camp on an area, and hunt and fish, and can co-exist with the rights of other land users. In sea areas, only non-exclusive native title can be recognised as exclusive native title is considered inconsistent with other common law rights regarding marine access and navigation (Native title 2010).

The Federal Court of Australia fist recognised native title over the sea for the Traditional Owners of Croker Island in Arnhem Land in 1998 (Tribunal File No. DCD 1998/001). Since the Crooker Islands Seas native title determination, (non-exclusive) native title in sea country has been recognised along Australia's coastline through numerous claims and determinations under the Native Title Act 1993.

A search of the National Native Title Tribunal (the Tribunal) database identified the following native titles claims and consent determinations within the Planning Areas.

Victoria

<u>Eastern Maar People</u>

The Eastern Maar People made application to the Federal Court of Australia for a native title claim which was accepted and registered on 20 March 2013 (Tribunal File No. VC2012/001). A consent determination by the Federal Court of Australia recognising the native title rights for the Eastern Maar Peoples was registered on 28 March 2023 (Tribunal File No. VCD2023/001). The native title area is located in south-western Victoria (Figure 6-102) near Port Fairy along the Great Ocean Road, up to Ararat in the north, and to Colac in the East and extends seaward 100 m from the mean low-water mark of the coastline (NNTT 2016).

The determination recognises Eastern Maar's non-exclusive right to access, use, and protect public land in accordance with their traditional law and custom. The Eastern Maar First Nations Corporation (EMAC) is the registered native title body corporate under the *Corporations (First Nations and Torres Strait Islander) Act 2006* and manages the native title rights for the Eastern Maar Peoples.

Gunditjmara - Part A

A consent determination recognising the native title rights of the Gunditjmara People was registered on 30 March 2007 (Tribunal File No. VCD2007/001) over 140,000 hectares in South-west Victoria (Figure 6-102). The determination recognises Gunditjmara People's native title rights and interests in traditional lands and waters and provides non-exclusive rights to access, use, and protect public land in accordance with their traditional law and custom. The Gunditj Mirring Traditional Owners Aboriginal Corporation (GMTOAC) is the registered native title body corporate under the *Corporations (First Nations and Torres Strait Islander) Act 2006* and manages the native title rights for the Gunditjmara Peoples.

Gunditjmara and Eastern Maar

On 27 July 2011, the Federal Court of Australia determined (Tribunal File No. VCD2011/001) that both the Traditional Owners represented by GMTOAC and the EMAC are the native title holders for the land and waters between the Shaw and Eumeralla Rivers from Deen Maar (including Yambuk) to Lake Linlithgow (Figure 6-102). The native title includes Deen Maar (Lady Julia Percy Island) which holds deep and significant cultural association for Traditional Owners (See Section 6.6.3).

Wadawurrung People

A native title claim application was registered for the Wadawurrung People on 24 July 2023 (Tribunal File No. VC2022/002). The claim area covers land and waters covering about 12,510 km^2 on the southern coast of Victoria (Figure 6-102). The application area is located southeast of Ararat and extends towards the coast around Sugarloaf, Geelong, and Port Phillip Bay.

The following native titles claims and determinations exist outside but adjacent to the Planning Areas.

Gunaikurnai People.

A determination by the Federal Court of Australia recognising the native title rights of the Gunaikurnai People over parts of the determination area was registered on 22 October 2010 (Tribunal File No. VCD2010/001). The area covers the land and waters, including sea country, from Wilsons promontory to Newmerella, and includes the culturally significant Nooramunga Marine & Coastal Park and Lakes Entrance and connected wetlands. The Gunaikurnai Land & Waters Aboriginal Corporation is the registered native title body corporate under the *Corporations (Aboriginal and Torres Strait Islander) Act 2006* and manages the native title rights for the Gunaikurnai People.

There are no registered claims or consent determinations in the area between north-east of the Gunaikurnai claim area and NSW border (search of the National Native Title Tribunal Register as of December 2023).

New South Wales

South Coast People

A native title claim application was registered for the South Coast People (which includes the Yuin People) on 31 January 2018 (Tribunal File No. NC2017/003). The area covers land and waters in New South Wales between Port Hacking in the north, the Towamba River in the south, the coast region between those rivers, and the eastern edge of the Southern Highlands (Figure 6-102).

Tasmania

There are no native title areas in Tasmania, however, there are five Indigenous Protected Areas on the islands of the Furneaux Group in Bass Strait (DPMC 2019).

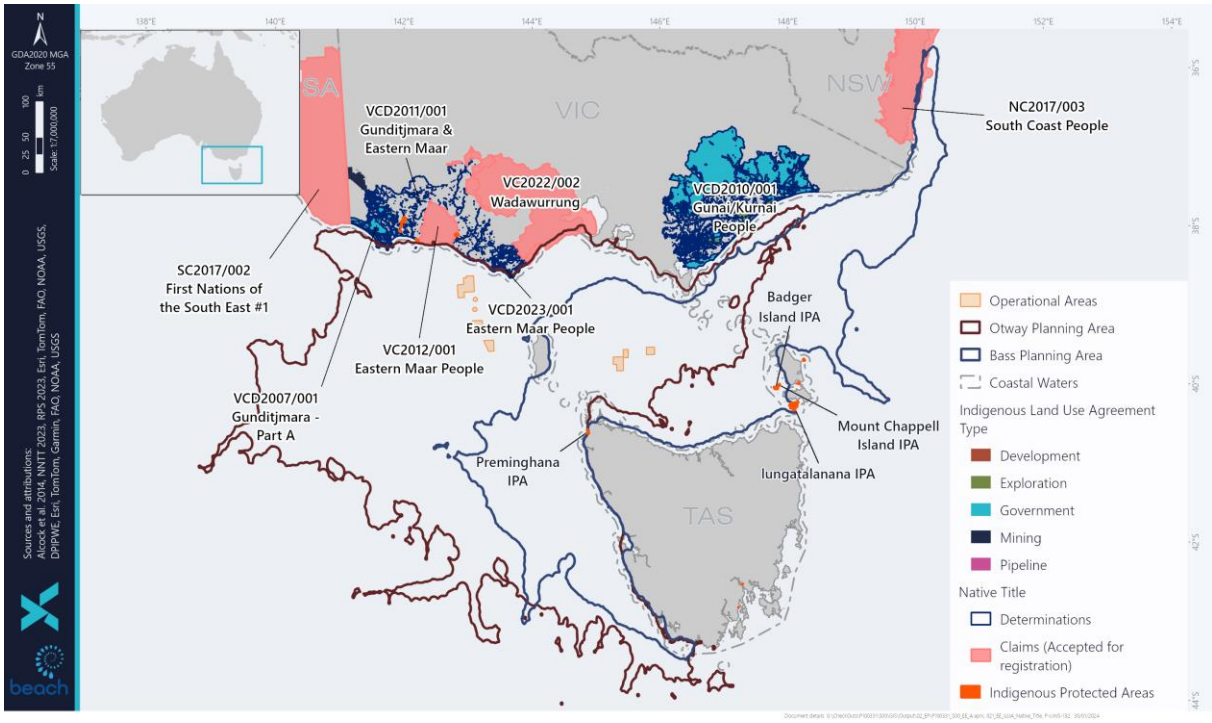


Figure 6-102: Native Title, Indigenous Protected Areas, and Indigenous Land Use Agreements within the Planning Areas

6.6.2.2 Registered Aboriginal Parties

As an operator in Victoria, Beach is also cognisant of the *Aboriginal Heritage Act 2006* (Vic) (AHA 2006 VIC) that recognises a Registered Aboriginal Party (RAP) as the Traditional Owner Corporation to manage and protect First Nations cultural heritage over their Country including coastal and onshore waters. The AHA 2006 VIC recognises RAPs as the primary guardians, keepers and knowledge holders of First Nations cultural heritage and the primary source of advice and knowledge on matters relating to First Nations places or objects in the appointed RAP region.

The following groups are recognised RAPs within the Planning Areas described in this EP:

- Eastern Maar Aboriginal Corporation
- Gunaikurnai Land and Waters Aboriginal Corporation
- Gunditj Mirring Traditional Owners Aboriginal Corporation
- Wadawurrung Traditional Owners Aboriginal Corporation

Figure 6-103 details the location of these Registered Aboriginal Parties.

There is no recognised RAP for the area between Gunaikurnai and New South Wales (Figure 6-103).

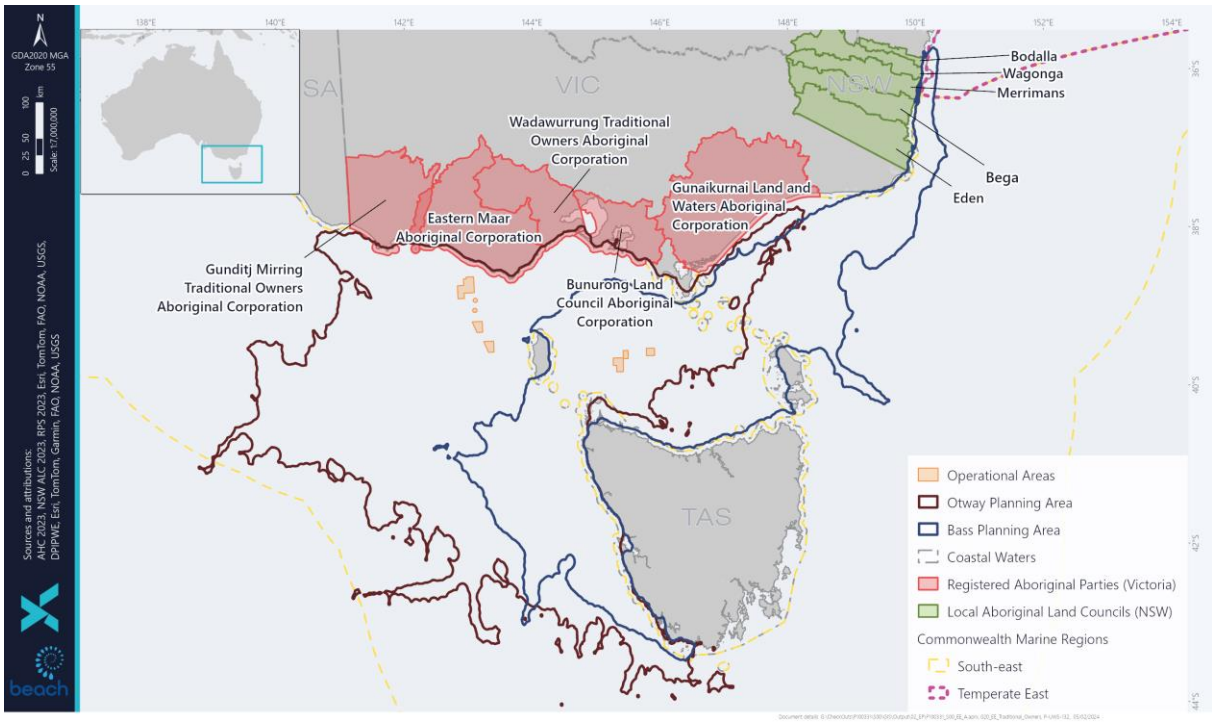


Figure 6-103: Victorian Registered Aboriginal Parties and NSW Local Aboriginal Land Councils within the Planning Areas

6.6.2.3 Indigenous Land Use Agreements

An Indigenous land use agreement (ILUAs) is a voluntary agreement between a native title group and other parties on the use and management of land and waters. ILUAs are established by the *Native Title Act 1993*.

No registered ILUAs were identified within the Operational Area. The following ILUAs have been identified in the Planning Areas.

- VI2006/004: Gunditj Mirring and State of Victoria.
- VI2010/001: Gunditj Mirring Non-Extinguishment Principle ILUA.
- VI2015/002: Gunditjmara – SEAGAS Port Campbell VIC to Torrens Island SA Pipeline ILUA.
- VIA1999/001: BHPP – Minerva.
- VIA2000/004: Blairgowrie.

ILUA locations are shown in Figure 6-102.

6.6.2.4 Land Rights

Most states and territory have legislation which sets out land rights arrangements with First Nations and Torres Strait Islander peoples within their jurisdiction. In most cases the statutory land rights legislation do not extend to marine areas. An exception is under the *Traditional Owner Settlement Act 2010* (Vic) which provides the possibility of agreements to extend to marine areas.

Victoria

In Victoria, the *Traditional Owner Settlement Act 2010 (Vic)* was developed as an alternative approach to the native title process that recognises traditional owners' relationship to land and provides certain rights on Crown land.

The Gunaikurnai People entered into an agreement with the State of Victoria under the *Traditional Owner Settlement Act 2010* (Vic). An agreement to commence negotiate a recognition and settlement agreement between the Eastern Maar and the Victorian Government under the *Traditional Owner Settlement Act 2010* was announced in 2017 (Justice and Community Safety (Vic), 2023).

In Victoria, the *Aboriginal Nations Heritage Act 2006 (Vic)* recognises a Registered Aboriginal Party as the Traditional Owner to manage and protect First Nations cultural heritage over their Country including coastal and onshore waters.

South Australia

In South Australia, the *Aboriginal Land Trust Act 2013 (SA)* is land rights legislation that provides for land to be acquired, held, and managed by the Aboriginal Lands Trust. No land rights have been granted or agreed under the relevant SA legislation within the Operational or Planning Areas.

Tasmania

Tasmania does not have a First Nations land rights legislative regime. Rather, under the *Aboriginal Act 1995* (Tas), grants of land parcels of historic or cultural significance 'to promote reconciliation with the Tasmanian Aboriginal community' may be made and vested in the Aboriginal Land Council of Tasmania. Some islands in the Bass Strait and within the Planning Areas, such as Badger Island and Clarke Island, were returned to the Tasmanian First Nations community under the *Aboriginal Lands Act 1995*.

New South Wales

The *Aboriginal Land Rights Act 1983* (NSW) establishes Aboriginal Land Councils to acquire and manage lands, and to perform other functions. The following Local Aboriginal Land Councils (LALC) are adjacent to the Bass Planning Area in New South Wales:

- Eden
- Bega
- Merrimans
- Wagonga
- Bodalla

6.6.2.5 Indigenous Protected Areas

Indigenous Protected Areas (IPAs) are areas of land and sea managed by First Nations groups through their custodianship and stewardship obligations for Country. IPAs deliver biodiversity conservation outcomes for the benefit of all Australians, through voluntary agreements the Traditional Owners of land or sea and the Australian Government. The IPA program has a dual purpose of achieving conservation obligations and providing sustainable uses to deliver social, cultural, and economic

benefits for local Indigenous communities. Indigenous People are active participants in the management of IPAs through land and sea ranger programs and other custodian and management activities.

No IPAs were identified in the Operational Areas. There are several IPAs that overlap with the Planning Areas (Figure 6-102) and are described below.

Badger and Mount Chappell Islands IPA

To the west of Flinders Island in the Bass Strait, Badger Island and its surrounding resources previously supported a community of Tasmanian First Nations people. No longer inhabited, the 1,244 ha island was dedicated as an IPA in 2000 (NIAA 2023). The First Nations history of, and connection to, Badger Island is rich and has stood for a very long time. From significant and ancient occupation evidence such as hearths and midden deposits dating back 20,000 years, to the development of Badger as a hub of a First Nations community and culture encompassing many islands in the Furneaux group in the mid-1800s, the First Nations people's connection to Badger Island continues (TAC 2020). Badger Island was returned to the Tasmanian First Nations community under the First Nations Lands Act 1995.

Badger Island is flat, with the highest point being 38 m above sea level and the remainder between 10 and 20 m above sea level. The landscape has been altered so that it is dominated by poa grasslands to accommodate sheep grazing on the island (TAC 2020).

To the west of Flinders Island, Mount Chappell Island was dedicated as an IPA in 2000. The 327 ha island also has important links to the Tasmanian First Nations community (NIAA 2023c). Managed by the Tasmanian First Nations Centre Rangers, work continues to protect the island's mutton bird rookeries and to maintain existing buildings on the island so that community members have a place to stay. The rangers are also revegetating the island with native plants and controlling weeds such as boxthorn, mirror bush and sea spurge. Mount Chappell Island's mutton bird chicks help feed the largest tiger snakes in Australia (NIAA 2023c).

The declaration of Badger Island and Mount Chappell Island IPAs was made under World Conservation Union (IUCN) Category V – Protected Landscape/Seascape: Protected Area managed mainly for landscape/seascape conservation and recreation.

Iungatalanana IPA

To the south of Cape Barren Island is lungatalanana (Clarke Island) at 8,159 ha is the third largest of the Furneaux islands. The island has strong links to the Tasmanian First Nations community and was dedicated as an IPA in 2009 (NIAA 2023a). In May 2005 that the Tasmanian Government returned ownership of lungatalanana to the First Nations community. The Aboriginal Land Council of Tasmania now hold the title for lungatalanana on behalf of all Tasmanian First Nations peoples.

Preminghana IPA

Bordering Tasmania and the Southern Ocean, Preminghana was dedicated an IPA in 1999. Covering 524 ha of land in the north-west, it protects historic First Nations engraving sites and the endangered Preminghana daisy (NIAA 2023b). Preminghana is a property of great significance to the Tasmanian First Nations community. The significance of Preminghana for the First Nations community reaches back to the dawn of time, and community ownership and management was only briefly interrupted by recent colonisation (TAC 2015). Prior to its return to the First Nations community the land was used for

sheep and cattle grazing, and large areas were damaged and had become overgrown with weeds. There was also damage to middens and sand dunes (TAC 2015).

Nevertheless, Preminghana retained its significant natural and cultural values. It is also home to a number of threatened plant and animal species. In addition to the engravings a further 53 sites have been recorded at Preminghana including middens, artefacts scatters and quarries where stone tool materials were sourced (TAC 2015), though these engravings and artefacts are not within the Planning Area.

The indigenous community of Preminghana published a Healthy Country Plan 2015 (TAC 2015). Preminghana contains a number of fauna species considered to be important to the First Nations community, including the Orange-bellied parrot which migrates as a whole through the site twice annually, most likely feeding in the coastal saltmarsh, grasslands, heath and moorlands.

Future Sea Country IPAs

The Australian Government, through DCCEEW, is expanding the IPA program. In 2021-22 the Australian Government announced a program to expand the IPA network to include coastal and marine areas (the Sea Country IPA Program). Through the Sea Country IPA Program, the Australian Government is seeking to strengthen the conservation and protection of the marine and coastal environments, while creating employment and economic opportunities for Indigenous People (DCCEEW 2024).

Of the ten future Sea Country IPA consultation projects announced in 2022, three are located within the Planning Areas (DCCEEW 2024).

Gunditjmara Sea Country IPA, Victoria (Gunditj Mirring Traditional Owners First Nations Corporation with Eastern Maar First Nations Corporation)

The IPA consultation area is located in south-west Victoria from the Convincing Ground north-east of Portland to Yambuk Lakes in the east. The area includes volcanic plains, rivers, coast, estuaries, and coastal wetlands, and is an important breeding place and nursery for fish, eels, and birds, including nationally listed species. The area's waters encompass sites of national geological and geomorphological importance, and habitat for threatened marine animal species. The area also incorporates important cultural sites such as Deen Maar Island, which has a central role in the creation story of Gunditjmara Country. Whilst Budj Bim is located outside of the Operational and Planning Areas, the Sea Country IPA Program will allow Traditional Owners to further protect the Budj Bim Cultural Landscape with activities including implementation of on land/sea management activities; community employment and capacity building; sharing and documentation of traditional knowledge; and the development and enhancement of regional partnerships.

Nanjit to Mallacoota Sea Country IPA, Victoria (Gurnaikurnai Land and Waters First Nations Corporation)

The IPA consultation area is in coastal waters of the Gippsland region in Victoria. The area comprises numerous marine and coastal parks and includes the Ramsar listed Gippsland Lakes and Raymond Island, a highly significant cultural site. A Junior Sea Country Ranger program will bring young Traditional Owners to work with and learn from senior rangers and Elders. IPA staff will participate in a Mulloway monitoring program to learn migratory patterns and health condition of this culturally important fish species, as well as undertake research to identify opportunities to protect and enhance

habitat for Australian bass and estuary perch. Gurnaikurnai Land and Waters First Nations Corporation will continue to identify and map land-based sites of cultural significance, building on the historical accounts of First Nations People in the region.

Tayaritja (Bass Strait Islands) Sea Country IPA, Tasmania (Tasmanian Aboriginal Centre)

The IPA consultation area is located in north-east Tasmanian waters and will link five existing island IPAs and other islands (including the Badger, Chappell, and Clarke Islands IPAs). The area includes Ramsar wetlands and ecologically significant coastal habitats. IPA staff will rehabilitate, restore, monitor, and evaluate ecologically significant marine ecosystems, helping to protect threatened marine animals and seabirds and over 120 plant species. The project includes implementation of a cultural burning program and a pest animal and weed management program aimed at maintaining healthy coastal ecosystems.

6.6.3 Cultural Values and Sensitivities

6.6.3.1 Country and Sea Country Overview

Country is a cultural landscape, it includes the tangible (cultural heritage) and intangible (song, creation stories and cultural practices). First Nations cultural concepts are firmly intertwined with the nature of the environment, of Country. Country describes all aspects of place, environment, spirituality, law, and identity. Part of Country that extends into the oceans is known as Sea Country. Values of Country differ between First Nations groups, and not all First Nations groups and communities in Australia hold the same belief systems as formational pillars of their community or spirituality. Differences can be due to aspects of post-colonialism, such as dispossession, genocide, and cultural practice restrictions.

Due to the varied culture and history of First Nations groups, and in particular owing to various degrees of dispossession and removal from country, loss of connection, and continuation of culture, the responses of First Nations communities to caring for and talking about Country are different throughout Australia. These individualised but community-based beliefs and values contribute to the need for a varied and responsive approach to managing cultural (tangible and intangible) values.

A cultural landscape is about both pre-colonial and contemporary interactions between humans and the physical environment including non-human animals, plants, physical structures, ancestors, song lines, trade routes and other significant cultural connections to Country. Cultural landscapes are reflections of how First Nations people engaged with Country, as they see that landscape features are not just physical features, their understanding is that the landscape intrinsically connects the past and the present to people, stories, and history.

Smyth and Isherwood (2016) describe Sea Country as all estuaries, beaches, bays, and marine areas collectively, within a traditional estate. Sea Country contains evidence of the ancient mystical events by which all geographic features, animals, plants, and people were created. Sea Country contains sacred sites and contains tracks (or song lines) along which mythological beings travelled during the creation period (Smyth and Isherwood 2016). The sea, like the land, is integral to the identity of First Nations groups. Connection to Sea Country is accompanied by a complexity of cultural rights and responsibilities. Formal recognition of Sea Country rights lags considerably compared to land rights; this could be for a range of reasons including conflicting perspectives and opinions on traditional custodianship of land and how far it extends (Smyth and Isherwood 2016).

Coastal areas were amongst the most densely populated areas, due to abundance of resources. Sea Country, as it does on land, has been found to contain evidence of the ancient Dreamtime events by which all geographic features, animals, plants, and people were created. Sea Country may contain sacred sites, which may be related to these creation events, and it contains tracks (or Songlines) along which ancestral beings travelled during the creation period. Sea Country has a continuing cultural value because of the connection to creation and dreaming stories, ceremonial sites, and places of occupation.

Country is the term often used by First Nations people to describe the lands, waterways, and seas to which they are connected. The term contains complex ideas about law, place, custom, language, spiritual belief, cultural practice, material sustenance, family, and identity (AIATSIS 2022). Sea Country also known as Saltwater Country extends into the Operational and Planning Areas.

6.6.3.2 First Nations Groups Sea Country within the Operational and Planning Areas

There are First Nations groups with Native Title recognition in areas adjacent the Operational Areas and Planning Areas. However, it is important to also acknowledge and respect the intangible cultural values and sensitivities that exist for other First Nations groups described in this section that are not directly adjacent to an Operational Area, due to the interconnectedness of marine ecosystems and existences of various marine fauna and flora and intangible cultural values. Table 6-37 summarises the First Nations peoples Groups in relation to the Operational and Planning Areas.

Table 6-37: Summary of First Nations Groups in relation to the Operational and Planning Areas

First Nations Group	Otway	Bass
Eastern Maar	Operational Area Planning Area	NA
Gunditj Mirring	Planning Area	NA
Wadawurrung	Planning Area	NA
Bunurong	NA	Operational Area
Gunaikurnai	Planning Area	Planning Area
Palawa (Tasmania)	Operational Area Planning Area	Operational Area Planning Area
Eden Local Aboriginal Land Council	NA	Planning Area
Bega Local Aboriginal Land Council	NA	Planning Area
Merrimans Local Aboriginal Land Council	NA	Planning Area
Wagonga Local Aboriginal Land Council	NA	Planning Area
Bodalla Local Aboriginal Land Council	NA	Planning Area

The land adjacent the Otway Operational and Planning Area is the traditional land of the Eastern Maar Peoples legally represented by the EMAC. EMAC is both a Registered Aboriginal Party and a Recognised Native Title Prescribed Body Corporate. Eastern Maar land extends north to Ararat and encompasses Port Fairy, Warrnambool, Port Campbell, and other areas along the Great Ocean Road. It also extends 100 m out to sea from low tide and therefore includes the iconic Twelve Apostles (EMAC 2024). Eastern Maar have always had a close connection with Sea Country which has nourished and supported their ancestors for thousands of years. Sea Country for Eastern Maar holds significant Dreaming stories, telling the story of their ancestors movement across Country. Harvesting of eel, or "*Kooyang",* is incredibly important to the Eastern Maar today and remains a cultural practice handed down from their ancestors (Source – consultation with Eastern Maar people Stakeholder ID 15333).

The land adjacent the Otway Planning Area includes the traditional lands of the Wadawurrung people. Sea Country, or "*Warre"* for Wadawurrung extends from Painkalac Creek at Aireys Inlet, east into Port Phillip Bay and to the Werribee River and to the north as far as Mt Emu and Fiery Creeks (Clark 1990). For the Wadawurrung peoples, *Warre*, holds the stories and footprints of their ancestors, with *Warre* being a place to meet, trade, share meals and practice ceremony. Eel, or *Beniyak,* have cultural significance to the Wadawurrung peoples (Source – consultation with Wadawurrung people Stakeholder ID 4194727).

The Wadawurrung native title claim and registration decision (Tribunal File No. VC2022/002) state that the claimants see Wadawurrung country and its waters as an anatomical being, with its head to the south, spine to the east, feet to the north and the arms lying along the Otway coast. This posture and orientation is replicated in traditional burial practices. Names of places in Wadawurrung language also follow the same theme and are named after body parts, like spine, head, tongue, or elbow. The Wadawurrung 'see our *Dja* land and *Warre* sea country as all one' (WTOAC 2020).

Also adjacent to the Otway Planning Area is the lands and Sea Country of the Gunditjmara. Gunditjmara recognise four types of landscape across their Country Sea Country, as one of the four, "*Koonang Mirring"* is defined by the meeting of salt and fresh water. Abundant in shellfish, fish, and birds, it also has a history of conflict and violence between the Gunditjmara and colonial settlers. Koonang Mirring includes the submerged landscape and the place where the spirits of Gunditjmara ancestors cross the sea to Deen Maar (CoA 2017c). Gunditjmara published their Sea Country plan, Gunditjmara Nyamat Mirring Plan 2023-2033, on 13 March 2024 (GMTOAC 2023). This plan details their cultural values and species of cultural significance. These species are discussed in Table 6-38. *Kooyang* (eels) are of particular significance to Gunditjmara and are discussed in Section 6.6.3.4.

The Bunurong First Nations peoples are the Traditional Owners of the Victorian land adjacent to the Bass Operational and Planning Areas and the Otway Planning Areas. They are represented by the Bunurong Land Council Aboriginal Corporation (BLCAC). Bunurong Country extends from the Werribee river to Wilsons Promontory includes some of the submerged land bridge to Tasmania (source - Consultation with BLCAC Stakeholder ID 1496). Through consultation with Beach, BLCAC advised that Sea Country is very significant for cultural practices and ceremony. Eels hold special cultural significance for the Bunurong people.

The Otway and Bass Operation and Planning Areas are also adjacent to *lutruwita* (Tasmania) The *palawa* (Tasmanian First Nations) are the Traditional Owners of *lutruwita* (Tasmania). *Palawa* people have inhabited Tasmania for at least 35,000 years. At the end of the last ice age the sea level rose, and Tasmania became isolated from the mainland of Australia. They survived in the changing landscape partly due to their ability to harvest aquatic resources, such as seals and shellfish. Following conflict

between the European colonists and the Tasmanian First Nation peoples, many were relocated to missions on Bruny Island, Flinders Island, and other sites, and finally to Oyster Cove. Through consultation with Department of Premier and Cabinet and Department of Aboriginal Affairs Tasmania (Stakeholder ID 243269638), Beach understands that kelp, whales, and mutton birds hold special cultural significance for First Nations peoples on mainland Tasmania, King Island and Flinders Island.

The Bass Planning Area is also adjacent to the Southern Yuin (*Murring*) nation which includes the *Ngarigo* speaking people of the *Monerro* (monaro) cultural landscape. The *Katungal* are the main sub group of coastal fishing people with which there are smaller groups identified. The languages spoken in this region are *Thawa* and *Bidwall* language groups. Southern Yuin people are represented by the Local Aboriginal Land Councils (LALC) as detailed in Section 6.6.2.4.

For the Southern Yuin people, traditional cultural fishing practices remain an integral part of the lives of First Nations peoples today. The following species are a traditional food source for the coastal Yuin and Monerro groups:

- Abalone (mutton fish)
- Bimbalas
- Oysters
- Mullet fish
- Eastern rock lobster

Other important cultural species include the southern right whale, which visits twice yearly, and dolphins, which are known to assist in fish harvesting. Blackfish or Warrgo, is a bush medicine for First Nations peoples and First Nations people in the Eden LALC have the legal right to continue to harvest this species.

Some of sea country priorities for the Eden LALC set out in the Land and Sea Country Management Plan (Donaldson et al. 2011) include restoration of coastal mangroves, marine debris clean-up programs, pacific oyster mapping and eradication program.

The Yuin people have strong cultural and spiritual ties to the land and sea in the coastal areas that are included in the Batemans Marine Park. The coast has provided food, shelter, and resources for First Nations people for thousands of years. The land and waterways, and the habitats that support the plants and animals, are important features in First Nations culture. They not only provide a source of food and medicine, but also include ceremonial areas, meeting places and sacred sites and spiritual areas. The traditional way to ensure that resources are maintained for the future is for them to become a totem for the local people. This encourages a system of kinship with the natural world, as well as ecological connectivity (Marine Parks Authority NSW 2013)

Species within the Batemans Marine Park that have cultural significance include:

- Barumguba (Montague Island)
- Mullet
- *Burumayal* / Bream

- Neptunes necklace, Nuruma, is a significant seasonal indicator.
- *Conk* / Triton shells
- *Walkamurra* / abalone
- *Bhittinga* / oysters
- *Joongar /* octopus
- *Dhagala* / flathead
- Eagleray

6.6.3.3 Sea Country Values

South-east Marine Region (Victoria, Tasmania)

The Otway Planning Area overlaps the South-east Marine Region (Figure 6-103). Indigenous uses and values within the South-east Marine Region are described in Sea Country - an Indigenous Perspective (NOO 2002b). Specifically, Indigenous activities described in the South-east Marine Region Profile (CoA 2015a) state:

Most parts of coastal Australia are of continuing cultural and spiritual significance to Indigenous people, many of whom engage in subsistence hunting, fishing and gathering and depend directly on marine resources for food. Through their involvement in commercial activities, many Indigenous people also depend on marine resources for their income.

Fishing is an important part of Indigenous culture, and a variety of methods and equipment are used, including hand gathering, lines, rods and reels, nets, traps and spears. Indigenous fishing targets a range of species of fish, shellfish, crabs and worms that are used for food, medicine or bait. Abalone, crab and lobster harvesting are important Indigenous fisheries. Indigenous people in south-eastern Australia engage in fishing and shellfish collecting on a regular basis and are involved in commercial fishing activities.

Indigenous people in the South-east Marine Region have articulated particular aspirations in terms of access rights and traditional use of marine resources, participation in management processes, and participation in the fishing sector.

First Nations people's interests in the South-east Marine Region, are diverse and complex. Indigenous people live around the region in major cities, regional centres, small towns and on First Nations land. Coastal areas of southeast Australia were amongst the most densely populated regions of pre-colonial Australia. These highly populated areas provided an abundance of marine and other resources. However, we know that many have been displaced from the coastal areas (NOO 2002b).

Temperate East Marine Region (NSW)

The Temperate East Marine Region covers a large area the runs from the southern boundary of the Great Barrier Reef Marine Park to Bermagui in southern New South Wales. The southernmost section of the Temperate East Marine Region is within the Bass Planning Area (Figure 6-103).

Many First Nations and Torres Strait Islander peoples have a close, long-standing relationship with coastal and marine environments and continue to rely on these environments and resources for their cultural identity, health, and wellbeing, as well as their domestic and commercial economies.

First Nations people claim inherited rights and responsibilities over sea country within the Temperate East Network.

It is recognised that spiritual corridors extend from terrestrial areas into nearshore and offshore waters, that a number of marine animals are totems for Indigenous people, and that songlines pass through marine parks.

6.6.3.4 Sea Country Values - Resources

Adornment and Function

Frequently, tangible resources, such as food items, animal and plant species, and other resources, such as stone, bone and wood, are also tied strongly to intangible elements of First Nations culture. First Nations people of Tasmania, the Palawa, were noted for creating durable and waterproof containers of sea-kelp threaded and dried to shape on wooden handles. In addition, shells were collected and worn as adornment. Throughout south-eastern Australia, reports of seaweed use include for cultural and ceremonial activity, medicine, clothing, food, fishing, and domestic/shelter uses (Thurstan et. al 2017). The Wadawurrung, for example, used "pink seaweed" as a poultice for jellyfish stings (Lane 1980).

Other fish and shellfish species have been noted by community during consultation, including abalone, cockles, and rock lobster (crayfish). The Eastern Maar have noted the migration routes of crustaceans as of notable significance. The Wadawurrung mention that crayfish, mussels, oysters, pipis, and fish provided important bush tucker, medicines, and other resources. Fish were caught using hooks, nets, and traps (WTOAC 2020). Other species were specifically not eaten or associated with other custom, for example, the Stingray (*Baalangurk)* was not eaten by the Kurnai (Howitt n.d.). Swans were hunted with boomerangs and spears, whilst other birds were caught in nets woven from plant fibres (WTOAC 2020).

Eels

It has been well documented that the Gunditjmara employed complex systems of aquaculture, comprising channels, weirs, and dams, to harvest *kooyang* (eels) on their Country (CoA 2017c). The migration of juvenile eels from freshwater to the ocean to mature and breed is integral to the survival of the species, and their physical health is inherently tied to the spiritually of the Gunditjmara. The aquaculture system is an economic and social base for Gunditjmara society (CoA 2017c). Eels and their migration are also held in social and cultural significance by the Eastern Maar, as neighbours to the Gunditjmara sharing many similar beliefs of their significance. Other coastal and river groups, including the Wadawurrung (buniya) and Bunurung, also utilised eels as an important resource and seek to protect their migration along rivers, creeks, and into the oceans. Section 6.4.7.3 provides more details on eels.

The Kulin and Kurnai Dreaming Story of Lo-an includes Lo-an and his wife Lo-an-tuka surviving mostly on eels cooked in a *marin-a-thung* (earth oven) on the Yarra flats. After finding a feather on his chest, Lo-an with Lo-an-tuka proceeded to follow the breeze to find the swans that the feather had come from and walked to the shores of Western Port. They camped for a long time feeding on swans and continued following the coastline to Corner Inlet. The Kulin believe they became the stars Sirius and

Canopis. The Kurnai believe Lo-an is upon his mountain and looks out towards to sea, watching over the people (Massola 1968).

Whales

Through consultation, whales and whale migration have been noted as of significance by coastal groups in Victoria. Eastern Maar have noted the migration routes of the southern right and blue whale as of social and cultural importance. The same whale species are similarly noted by the Gunditjmara and Wadawurrung.

First Nations communities in the south-east of Australia often saw whales as spirits that transformed when they entered the water, creating a respectful relationship between whales and First Nations communities. Whale hunts took place from small, shore-based vessels, and targeted smaller animals (Eldridge 2015). In New South Wales, whale hunting targeted migrations from the Pacific to the Southern Ocean. First Nations methods of hunting may have included using fire and smoke to lure the whales to the coast and bays (Eldridge 2015), and the opportunistic utilisation of beached whales also occurred, which may have prompted periods of intense gathering of people and ceremony like those observed by early settlers such as Henty (Eldridge 2015). In Howitt's notes on the Kurnai, whales are called *Ganda* - 'Dead whales thrown up by the sea were supposed to have been killed by the *Mrarts* [ghost or spirit] and birds called *Yauruk* [or *Yara-wuk*] and sent ashore. The *Mrarts* then communicated to the *Biraaks* who told the Kurnai where to go and find the *Ganda*. (Howitt n.d.).

The Gunaikurnai have noted bottlenose dolphin at Lakes Entrance, and the significance of dolphins is echoed by the Wadawurrung. Wesson (2001) notes that 'the souls of prominent community leaders [were] reincarnated as dolphins and orcas'.

6.6.3.5 Sea Country Intangible Values

Landforms and landscape features in and surrounding watery places are known to hold particular significance for First Nations coastal communities. Islands off the Southern Ocean coastline have cultural importance to First Nations people as Islands of the Dead and are frequently connected to the shore by journey-after-death stories (Draper 2015).

For example, the Gunditjmara of Western Victoria seasonally occupied the caves and escarpments in the coastal limestone karst formation. These caves at Cape Bridgewater are associated with *Bunjil* who descended from the caves where he resided to walk along the shoreline (Bonwick 1858). The Gunditjmara believe that *Bunjil*, their creator and eagle and his brother Pallian ascended to the sky from Deen Maar in a sheet of flame after creating the land and sea and all living things' (Draper 2015). Mathews (1904) noted that the Gunditjmara buried their dead on the mainland with their heads pointed to Deen Maar island where their souls would be transported to await reincarnation. Dawson (1881) records that a haunted cave, *Tarn wirring* 'road of the spirits', is believed to form a passage between the mainland and the island, and the good spirit '*Put put cheptech*' conveys the spirit from the island to the clouds. Other Islands in south-eastern Australia, such as Kangaroo Island (*Karta*), hold similar stories.

Contact and post-contact places are also noted to be in or adjacent to Sea Country, and these include sites of massacre and dispossession. The site of the Convincing Ground massacre (1833/34), where a group of whalers murdered Gunditjmara over ownership of a stranded whale, is located north of Allestree on the Portland coast. This place continues to be a place of great sorrow for the community. Other coastal massacre sites include on the Aire River Estuary at Cape Otway (1846), Eurmerella (1842),

Freshwater Creek (1843) Twofold Bay (1806), and Cape Grimm (1828) (Newcastle University 2024). Missionary activity and forced removal of First Nations people in Tasmania resulted in detainment of First Nations people on Flinders Island (at Wybalenna). Other First Nations groups were taken to Swan Island and Gun Carriage Island. This detainment resulted in significant loss of life, and a loss of culture, language, and connection.

Law, Spirituality and Songlines

Intangible heritage refers to the cultural assets, cultural knowledge and intellectual property collectively held by First Nations and may involve practices, oral traditions, ancestral narratives, performing arts, local knowledges and practices concerning nature, the environment, and the universe. Intangible cultural heritage performs an important function of safeguarding to recognise and protect knowledge and skills that are transmitted through it from one generation to the next.

Songlines are described as short songs pertaining to the travels and exploits of ancestral beings during the Dreamtime. These songs are usually sung in association with a ritual activity, particularly dancing (Tonkinson 1972). Songlines are stories ancestral beings which includes creation stories, they are multipurpose the stories educate and uphold traditional lore, they are also communication and trade routes. (Fuller & Busill 2021).

Understanding First Nations songlines and stories also means understanding the Dreaming. Often described as the 'Dreamtime', or 'deep time', recognising the existence of Dreamtime beyond the Western concept of past, present, and future.

First Nation's people around Australia have long had a strong connection to whales, which has significance as totemic ancestors to some groups. The arrival of whales along Australia's coastline marked the arrival of the "elders of the sea", which follows a songline or ancient memory code, that traces the journeys of ancestral spirits as they created the land, animals, and lore.

In Victoria, *Koontapool* (southern right whales) occur along the coastlines of south-west Victoria in Gunditjmara Sea Country to feed and birth. These *Koontapool Woorrkngan Yakeen* (Whale Birthing Dreaming Sites), are in coastal bay areas from Port Campbell to Portland, including Warrnambool. These places on Gunditjmara Country are known resting and feeding sites for mothers and calves and are directly related to *Gunditjmara Neey*n (midwives), explaining why Gunditjmara is a Matrilineal Nation. (DCCEEW 2022a).

A Kulin Dreaming story includes Angel Cave (between Port Philip and Western Port) where "One Day Bunjil, the All Father, was walking upon the sea, when suddenly there rose a great storm. Bunjil walked to the rocky shore and spoke to it, and immediately the shore rose up into a cliff and the cave was made before his eyes. Bunjil stepped into it and sheltered there till the storm was over' (Massola 1968).

A Kurnai Dreaming story of Port Albert includes the sick frog, Tide-lek, who drank all the water from the land. He didn't feel sick anymore, but he felt bad for leaving the people with nothing to drink. He walked across Port Albert one day and everyone tried to make him laugh to regurgitate the water, but they all failed until No-yang (the eel) danced on his tail and Tide-lek laughed and the land flooded. Many people died or were marooned, forming the islands. The pelican saved people with a large canoe. As part of this Dreaming Story, the pelican also formed the white pipe-clay used for ceremony at White Rock, the southernmost Island of the Seal Group east of Wilsons Promontory (Massola 1968).

In the south coast of NSW, the following Dreaming story is recorded. 'Long ago Daramulan lived on the earth with his mother Ngalalba. Originally the earth was bare and 'like the sky, as hard as a stone', and the land extended far out where the sea is now. There were no men or women, but only animals, birds, and reptiles. He placed trees on the earth. After Kaboka, the thrush, had caused a great flood on the earth, which covered all of the east coast country, there were no people left, except some who crawled out of the water onto Mount Dromedary... 'then Daramulan went up to the sky, where he lives and watches the actions of men. It was he who first made the Kuringal and the bull-roarer, the sound of which represents his voice. He told the Yuin what to do, and he gave them the laws which the old people have handed down from father to son to this time...' (Howitt 1904).

As part of the Kurnai creation stories the first man and woman were Borun the pelican, and Tuk the musk duck (VACL 2014). Totemic Species are spiritually important and can be bestowed in a number of ways – through family relations or through ceremony. Randall Mumbler, from the Eurobodalla region, for example, discusses that '… Fish are more likely to be ceremonial totems; it is not common to have a fish as a totem… I have certain species that I can't fish for or eat. These rules have been placed upon me through ceremony and so I stay away from them. There are certain fish that my brother and I never eat. That is also like a conservation thing…it keeps that species alive…" Randal Mumbler (in Donaldson 2012).

The Eastern Maar discuss their connection to Sea Country noting that the sea was 'central to our culture, economy, and survival. The coastline is home to sites that are important for our Dreaming - Three Sisters Rocks and Deen Maar (Lady Julia Percy Island) where our Ancestors leave the earth. Our connection with our Sea Country extends well beyond the current shoreline to the edge of the continental shelf. While this area is under the sea today, we occupied it for thousands of years and rising sea levels have not washed away the history, physical evidence or our connection (Eastern Maar Aboriginal Corporation 2015).

6.6.3.6 Submerged Cultural Heritage and Landscapes

First Nations peoples in Victoria have occupied, used, and managed sea country for thousands of years, including areas now submerged by sea level rise since time immemorial (Smyth 1993).

An understanding of submerged landscapes and sea level changes may be evident from stories from First Nations groups, "Indigenous peoples still relate to land that was inundated by sea during the last ice age and regard it as their own" (NOO 2002b).

The lava flows of the World Heritage listed Budj Bim Cultural Landscape (which is outside of the Operational and Planning Areas) have recently, through ocean scanning methods, been revealed to extend into the sea. The mapping of this geological formation allows the Gunditjmara to connect to Sea Country in new ways assisted by modern technology, as a supplement to their traditional knowledge and ancient connection to the sea. There is potential that early cultural deposits relating to aquaculture systems have been preserved in association with this formation, and as stated above evidence of this kind is highly significant to Gunditjmara.

6.6.3.7 Conservation and Contemporary Cultural Values

It is frequently raised by First Nations communities that ecological protection and sustainability is integral to First Nations cultural and contemporary values. Sea Country Plans, such as those completed by the Gunditjmara (GMTOAC 2023), Gunaikurnai (GLAWAC 2015), Wadawurrung (WTOAC. 2020), and Eastern Maar (EMAC 2015), highlight the importance of approaches that protect and enhance the

environment, including biodiversity, coastal erosion, management of sea level rise and addressing climate change impacts. Goals include managing impacts to whale migration, bird and bat nesting and migration (such as the microbat, bent-wing bat, and orange-bellied parrot), protection of environmentally fragile resources such as seagrass and kelp fields, as well as securing habitat for threatened species such as the leafy seadragon.

'Increased pollution from coastal communities, agricultural and industrial run off is changing the sea hydrology and choking our sea life with plastics. Our Warre is being overused and heating up with climate changes. We are seeing the loss of our kelp forests and dramatic changes in sea life which we all depend upon' (WTOAC 2020).

'Our coastal dunes are layered with living places and hearths from the many generations of our ancestors living, harvesting, sharing meals, trading in these living places, and practicing ceremony here. We have the largest stretch of registered cultural sites in Australia along our coastline. Our fish traps, which were used to catch the abundant fish, have survived the storms and sea level changes. Ochre pits of different colours are dotted along our sandstone and limestone cliffs and headlands. Our sandy beaches, rock pools, rocky platforms and reefs were and continue to be places of abundance for harvesting food and resources like crustaceans, shellfish, and kelp' (WTOAC 2020).

Seals, or *Bithaui* or *Gurnun* in Kunai (Howitt n.d.), are noted by the Gunaikurnai as a significant species, and habitat for fur seals at Wilsons Promontory Marine National Park is identified as an important resource to be protected, particularly due to the reliance of species on both the land and sea for different life cycle stages. It is therefore considered important that programs for environmental management consider both land and marine environments, as they are interconnected and must be managed as a whole to ensure success (GLAWAC 2015).

Through the processes identified above, and in particular, consultation with First Nations Groups, Beach is confident we have identified the cultural heritage values, and cultural features and sensitivities of First Nations groups identified within the Operational and Planning Areas.

6.6.4 Assessment of Potential Impacts and Risks to Cultural Values and Sensitivities

Section 7 evaluates the environmental impacts and risks of the Drilling Program and identifies where First Nations cultural values and sensitivities may be potentially affected. Table 6-38 provides a summary of the First Nations cultural values and sensitivities identified as per the methodology in Section 6.6.1, and shows where a potential impact has been identified via the evaluation of the environmental impacts and risks (Section 7). Where a potential impact to First Nations cultural values and sensitivities has been identified, details of the control measures, if required, to reduce impacts and risks from the Drilling Program are of an acceptable level and as low as reasonably practicable are provided as required by the OPGGS(E)R.

As noted in Section 6, the Planning Area is used as the spatial boundary for the describing the existing environment, however, it does not represent the environment that may be affected (EMBA) as the EMBA varies based on each impact and risk. Thus, the EMBA for each impact and risk is detailed in each impact and risk evaluation in Section 7.

Table 6-38: Summary of First Nations Cultural Values and Sensitivities and Where a Potential Impact has been Identified.

	Aspect - Planned							Aspect - Unplanned					
	Light emissions	**Atmospheric emissions**	**Underwater sound**	**Physical presence**	**Seabed disturbance**	**Rig and vessel marine discharge**	**Drilling, completions, P&A marine discharge**	**Invasive Marine Species**	**Fauna interaction**	**Loss of Materials or Waste**	**Loss of containment**	**Spill Response**	**Comment**
Cultural Values													
Budj Bim Cultural Landscape													The Budj Bim Cultural Landscape is outside of the Operational and Planning Areas.
Onshore cultural heritage, relics, and artefacts											✓	✓	In the highly unlikely event of a spill onshore cultural heritage, relics and artefacts could be impacted. This is assessed in Section 7.12.5.5 for direct impacts and Section 7.13.7.4 in relation to oil spill response.
Submerged Cultural Heritage					✓								Submerged cultural heritage could be disturbed if present where the rig anchors and drilling are located. This is assessed in Section 7.6.5.4.
Batemans Marine Park													The Batemans Marine Park is identified as being within the Planning Area but not within any of the EMBAs for the planned aspects or unplanned aspects.
Badger Island IPA											✓		Badger Island and hence the IPA has been identified as being within the Spill EMBA – Social but not any other EMBA for the planned aspects or unplanned aspects. Shoreline oil at the actionable level was not predicted to occur within the IPA. This is assessed in Section 7.12.5.5 in relation to a spill.
lungatalanana IPA (Clarke Island)													Clarke Island and hence the IPA has been identified as being within the Planning Area but not within any of the EMBAs for the planned aspects or unplanned aspects.
Mount Chappell Island IPA Mutton bird rookeries													Mount Chappell Island and hence the IPA has been identified as being within the Spill EMBA – Social but not any other EMBA for the planned aspects or unplanned aspects. Shoreline oil at the actionable level was not predicted to occur within the IPA. This is assessed in Section 7.12.5.5 in relation to a spill. A number of EMBAs for the planned aspects and unplanned aspects overlap the short-tailed shearwater (mutton bird) foraging Biologically important area. See Birds – muttonbird below.
Preminghana IPA Orange-bellied parrot Threatened plant and animal species Artefacts											✓		Preminghana IPA has been identified as being in the Spill EMBA – Social but not any other EMBA for the planned aspects or unplanned aspects. In addition, shoreline oil at the actionable level may occur within the IPA. This is assessed in Section 7.12.5.5. in relation to a spill and Section 7.13.7.4 in relation to oil spill response. A number of EMBAs for the planned aspects and unplanned aspects overlap the orange-bellied parrot migration route. See Birds – orange-bellied parrot below.
Deen Maar													Three sisters rocks and Deen Maar are~ 78.5 km from the Operational Area. Three sisters rocks and Deen Maar is identified

	Aspect - Planned							Aspect - Unplanned					
	Light emissions	Atmospheric emissions	Underwater sound	Physical presence	Seabed disturbance	Rig and vessel marine discharge	Drilling, completions, P&A marine discharge	Invasive Marine Species	Fauna interaction	Loss of Materials or Waste	Loss of containment	Spill Response	Comment
													as being within the Planning Area but not within any of the EMBAs for the planned aspects or unplanned aspects.
Kelp Seagrass											✓		Section 6.4.1.5 provides details on kelp and Section 6.4.1.4 on seagrass. In the highly unlikely event of a spill, impacts to kelp and seagrass could occur if they were in areas where hydrocarbons may be present. This is assessed in Section 7.12.5.1.
Abalone (mutton fish)											✓		Abalone are generally found in water depths up to 30 m (VFA 2024) which is outside of the Operational Area and EMBAs for planned aspects. In the highly unlikely event of a spill, impacts to abalone could occur if they were in areas where hydrocarbons may be present. This is assessed in Section 7.12.5.2.
Crab Rock lobster (crayfish) Crustacean migration route											✓		Section 6.4.5 provides details on invertebrate species such as crab and rock lobster. First Nations collection of crab and rock lobster would be within nearshore areas outside of the Operational Area. In the highly unlikely event of a spill, impacts to these species could occur if they were in areas where hydrocarbons may be present. This is assessed in Section 7.12.5.2. Impacts to crustacean migration route are not predicted from the Drilling Program. This was raised during stakeholder consultation for the future OGV Development in relation to pipelines which are not part of this EP scope.
Bimbalas (blood cockle Anadara spp) Mussels Oysters Pipis											✓		Collection of mollusc species such as bimbalas, mussels, oysters and pipis occurs nearshore outside of the Operational Area. In the highly unlikely event of a spill, impacts to the mollusc species could occur if they were in areas where hydrocarbons may be present. This is assessed in Section 7.12.5.2.
Eels (*Kooyang*)	✓		✓			✓	✓				✓		Section 6.4.7.3 provides detail on eels and their migration. Several EMBAs overlap where migrating eels may be present. See: Light – Section 7.2.5.1 and 7.2.5.4. Underwater sound – Section 7.4.8.4 and 7.4.8.7. Vessel & Rig discharges - 7.7.5.2 and 7.7.5.4. Drilling and P&A discharges – Section 7.8.3. Loss of Containment - 7.12.5.2
Fish - general	✓		✓			✓	✓				✓		Section 6.4.7.3 provides details on fish. Several EMBAs overlap where fish may be present. See: Light – Section 7.2.5.1 and 7.2.5.4. Underwater sound – Section 7.4.8.4 and 7.4.8.7. Vessel & Rig discharges - 7.7.5.2 and 7.7.5.4. Drilling and P&A discharges – Section 7.8.3.

	Aspect - Planned							Aspect - Unplanned					
	Light emissions	Atmospheric emissions	Underwater sound	Physical presence	Seabed disturbance	Rig and vessel marine discharge	Drilling, completions, P&A marine discharge	Invasive Marine Species	Fauna interaction	Loss of Materials or Waste	Loss of containment	Spill Response	Comment
													Loss of Containment - 7.12.5.2
Fish - Blackfish													Blackfish are an inland river fish (VFA 2024a) and therefore outside of the Operational and Planning Areas.
Fish - Mullet													Sea mullet are particularly abundant in estuaries and coastal waters of NSW (DPI 2024). Mullet may also be an inshore species (Feary 2015). In Victoria sea mullet usually live in the less saline areas of Port Phillip, and often venture into the Yarra River (Port Phillip Bay 2024). These areas are not within not within any of the EMBAs for the planned aspects or unplanned aspects.
Birds - general	✓	✓								✓	✓	✓	Section 6.4.7.4 provides details on the birds with a focus on those that have BIAs or are undertaken biologically important behaviour. The Light EMBA and Operational Area where fauna interaction and loss of waste or materials could occur, overlap a number of bird BIAs. In the highly unlikely event of a spill, impacts to birds could occur if they were in areas where hydrocarbons may be present. They may also be present in areas where access is required for spill response activities. Light – Section 7.2.5.1. Atmospheric emissions – Section 7.3.5 Fauna Interaction – Section 7.10.5.1 Loss of Materials or Waste – Section 7.11.4.1. Loss of Containment – Section 7.12.5.2 Spill Response - 7.13.7.1
Birds - Orange-bellied parrot	✓	✓							✓			✓	Section 6.4.7.4 provides details on the orange-bellied parrot. The Light EMBA and Operational Area where fauna interaction could occur, overlap the orange-bellied parrot migration route. In the highly unlikely event of a spill, impacts to orange-bellied parrots are not predicted as they do not land or forage at sea or on shorelines where hydrocarbons may be present. They may be present in areas where access is required for spill response activities. Light – Section 7.2.5.1. Atmospheric emissions – Section 7.3.5 Fauna Interaction – Section 7.10.5.1 Spill Response - 7.13.7.1
Birds – muttonbird	✓	✓							✓	✓	✓	✓	Section 6.4.7.4 provides details on the short-tailed shearwater (muttonbird). The Light EMBA and Operational Area where fauna interaction and loss of waste or materials could occur, overlap the short-tailed shearwater foraging BIA. In the highly unlikely event of a spill, impacts to short-tailed shearwaters could occur if they were forage at sea where hydrocarbons may be present. They may also be present in areas where access is required for spill response activities.

	Aspect - Planned							Aspect - Unplanned					
	Light emissions	Atmospheric emissions	Underwater sound	Physical presence	Seabed disturbance	Rig and vessel marine discharge	Drilling, completions, P&A marine discharge	Invasive Marine Species	Fauna interaction	Loss of Materials or Waste	Loss of containment	Spill Response	Comment
													Light – Section 7.2.5.1. Atmospheric emissions – Section 7.3.5 Fauna Interaction – Section 7.10.5.1 Loss of Materials or Waste – Section 7.11.4.1. Loss of Containment – Section 7.12.5.2 Spill Response - 7.13.7.1
Bats													Bats may be present in coastal areas of the Planning Areas but impacts from hydrocarbon exposure are not predicted to caves where including maternity caves.
Dolphins			✓			✓	✓		✓	✓	✓		Section 6.4.7.6 provides details on dolphins. The Underwater Sound EMBA and Operational Area where discharges, fauna interaction and loss of waste or materials could occur, overlap where dolphins may be present. In the highly unlikely event of a spill, impacts to dolphins could occur if they were in areas where hydrocarbons may be present. Underwater sound – Section 7.4.8.2. Vessel & Rig discharges - 7.7.5.2 Drilling and P&A discharges – Section 7.8.3. Fauna Interaction – Section 7.10.5.1 Loss of Materials or Waste – Section 7.11.4.1. Loss of Containment - 7.12.5.2
Whales Blue Southern right Orcas Migration routes			✓			✓	✓		✓	✓	✓		Section 6.4.7.6 provides details on whales. The Underwater Sound EMBA and Operational Area where discharges, fauna interaction and loss of waste or materials could occur, overlap where whales may be present. In the highly unlikely event of a spill, impacts to whales could occur if they were in areas where hydrocarbons may be present. Underwater sound – Section 7.4.8.2. Vessel & Rig discharges - 7.7.5.2 Drilling and P&A discharges – Section 7.8.3. Fauna Interaction – Section 7.10.5.1 Loss of Materials or Waste – Section 7.11.4.1. Loss of Containment - 7.12.5.2.
Seals			✓			✓	✓		✓	✓	✓		Section 6.4.7.7 provides details on seals (pinnipeds). The Underwater Sound EMBA and Operational Area where discharges, fauna interaction and loss of waste or materials could occur, overlap where dolphins may be present. In the highly unlikely event of a spill, impacts to dolphins could occur if they were in areas where hydrocarbons may be present. Underwater sound – Section 7.4.8.2. Vessel & Rig discharges - 7.7.5.2 Drilling and P&A discharges – Section 7.8.3. Fauna Interaction – Section 7.10.5.1

	Aspect - Planned							Aspect - Unplanned					
	Light emissions	Atmospheric emissions	Underwater sound	Physical presence	Seabed disturbance	Rig and vessel marine discharge	Drilling, completions, P&A marine discharge	Invasive Marine Species	Fauna interaction	Loss of Materials or Waste	Loss of containment	Spill Response	Comment
													Loss of Materials or Waste – Section 7.11.4.1. Loss of Containment - 7.12.5.2.

7 Environmental Impact and Risk Assessment

7.1 Overview

In alignment with the OPGGS(E)R, this section of the EP details the potential environmental impacts and risks associated with the Drilling Program and provides an evaluation of all the impacts and risks appropriate to the nature and scale of each impact or risk. This evaluation includes impacts and risks arising directly or indirectly from the activity and includes potential oil pollution emergencies and the implementation of oil spill response strategies and oil spill monitoring.

In addition, this section details the control measures (systems, procedures, personnel, or equipment) that will be used to reduce potential impacts and risks to ALARP and acceptable levels. Environmental performance outcomes (EPOs), environmental performance standards (EPSs) and measurement criteria associated with each of the identified control measures are provided in Section 7.15.

Aspects associated with the use of vessels for oil spill response activities are as per vessel operations in Table 7-1. Other aspects and related impacts and risks associated with oil spill response activities are described in Section 7.13.

Table 7-1: Activity – Aspect Relationship

	Aspect - Planned							Aspect - Unplanned			
	Light emissions	**Atmospheric emissions**	**Underwater sound**	**Physical presence**	**Seabed disturbance**	**Rig and vessel marine discharge**	**Drilling, completions, P&A marine discharge**	**Invasive Marine Species**	**Fauna interaction**	**Loss of Materials or Waste**	**Loss of containment**
Support Operations											
Rig operations	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Vessel operations	✓	✓	✓	✓		✓		✓	✓	✓	✓
Helicopter		✓	✓								
Pre-laid anchors				✓	✓						
Spill response	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Well Activities											
Drilling					✓		✓				✓
Completions (Yolla 7 only)							✓				✓
Flaring (Yolla 7 only contingency)	✓	✓									
Well suspension					✓		✓				✓
P&A					✓		✓				✓

7.2 Light Emissions

7.2.1 Source of Aspect

As the activity will be undertaken 24 hours a day, lighting on the drill rig and vessels is required at night for navigation and to ensure safe operations.

In addition, flaring may be undertaken on the Yolla 7 well for up to 48 hours (contingency only).

7.2.2 Extent and Duration of Aspect

Drill Rig and Vessel Lighting	
Extent (EMBA)	*20 km for marine turtles, seabirds, and migratory shorebirds.* The extent for drill rig and vessel light emissions is based on the National Light Pollution Guidelines for Wildlife (CoA 2023). The guidelines recommend undertaking a light impact assessment where important habitat for listed species sensitive to light are located within 20 km of the light source. The 20 km threshold provides a precautionary limit based on observed effects of sky glow on marine turtle hatchlings demonstrated to occur at 15-18 km and fledgling seabirds grounded in response to artificial light 15 km away (CoA 2023). Seabird grounding, as described in Rodriguez et al. (2014), relates to impacts of onshore fixed light sources such as streetlights and buildings and the effect this can have on young fledgling birds making their first flight from their nests to the open ocean. Thus, 20 km is adopted as the extent at which light emissions may impact marine turtles, seabirds, and migratory shorebirds. *200 m for zooplankton, invertebrates, and fish.* For zooplankton and invertebrates, the Guidelines detail that for vessel lights zooplankton and their vertebrate predators descend away from the surface; these effects occurred at depths of up to 200 m, and up to 200 m horizontally from the light source. Experiments using light traps also detailed that some fish and zooplankton species are attracted to light sources (Meekan et al. 2001), with traps drawing catches from up to 90 m (Milicich et al. 1992). Thus, 200 m is adopted as the extent at which light emissions may impact zooplankton, invertebrates, and fish. The actual predicted area of impact at any one time will be significantly less than 20 km or 200 m around each vessel operating within the operational areas.
Duration	560 days Drill rig and vessel navigational and safety lighting is required at night for the duration of the activity.
Flaring (contingency only)	
Extent (EMBA)	*50 km from the Yolla 7 well* A light assessment study undertaken for the ConocoPhillips Australia Otway Exploration Drilling Campaign (Xodus Group 2023) located in the Bass Strait predicted the area that may be affect by light from flaring to be up to 49 km from the rig with no measurable changes to ambient light intensity levels beyond this distance. Shell (2009) estimated that light from production flaring activities can be detected as far as 51 km from the source. Similarly, an assessment by Woodside (2014) for the Browse FLNG development reported that the maximum distance at which production flaring under routine operational conditions was detectable was 47.9 km.
Duration	48 hours

7.2.3 Predicted Environmental Impacts

The predicted environmental impacts from light emissions are:

- Changes in fauna behaviour, through attraction or avoidance of light-sensitive species.
- Changes to the functions, interests, or activities of other users.
- Changes in ambient light leading to changes to aesthetic, and conservation values.

7.2.4 EMBA

The National Light Pollution Guidelines for Wildlife (CoA 2023) recommend undertaking a light impact assessment where important habitat for listed species sensitive to light are located within 20 km of the light source (CoA 2023). In addition, an area of 50 km for flaring at the Yolla 7 well location was used. This combined area is referred to as the light EMBA. Figure 7-1 details the light EMBA.

The results of the light EMBA PMST Report are presented in Appendix E. 3.

Light emissions may impact the following receptors within the light EMBA:

- Zooplankton, invertebrates, and fish
- Seabirds and migratory shorebirds
- Marine turtles
- Commercial squid fisheries
- Coastal communities

The ecological receptors identified above are values of the following within the light EMBA:

- Conservation values and sensitivities
- Cultural values and sensitivities

7.2.5 Predicted Level of Impact

7.2.5.1 Ecological Receptors

Seabirds may be attracted to the light glow from the rig, support vessels and flaring. Bright lighting can disorientate birds, thereby increasing the likelihood of seabird injury or mortality through collision with the vessel, or mortality from starvation due to disrupted migration or foraging at sea (Wiese et al. 2001). Disorientation may also result in entrapment, stranding, grounding, and interference with navigation (CoA 2023). Whilst all bird species are vulnerable to the effects of lighting, seabirds active at night while migrating, foraging, or returning to colonies are most at risk (CoA 2023).

For the light impact assessment, the process outlined in the guidelines is used. The aim of the guidelines is that artificial light will be managed so wildlife is:

- Not disrupted within, nor displaced from, important habitat.
- Able to undertake critical behaviours such as foraging, reproduction and dispersal.

Identification of marine turtles, seabirds, and migratory shorebirds was undertaken through definition of a light EMBA. Identification of other species such as zooplankton, invertebrates and fish were identified using the Operational Area based on an extent of impact of 200 m.

The guidelines detail that important habitats are those areas necessary for an ecologically significant proportion of a listed species to undertake important activities such as foraging, breeding, roosting or dispersal. Table 7-2 details the shorebirds and seabirds that may be foraging, breeding, roosting, or migrating within the light EMBAs. These were identified from the light EMBA PMST Report (Appendix E. 3), and BIAs were identified from the National Conservation Values Atlas. No roosting or breeding behaviours have been identified within the light EMBA.

Artificial light can disrupt turtle nesting and hatching behaviours and is listed as a key threat in the Recovery Plan for Marine Turtles in Australia (CoA 2017b). Listed turtle species may occur within the light EMBA, however, no biologically important behaviours, BIAs, or habitat critical to survival for marine turtles were identified. In addition, there are no turtle nesting areas in the region. Therefore, impacts to turtles from light emissions is not predicted.

The light-sensitive receptors that may occur within the light EMBAs are:

- Seabirds and migratory shorebirds.
- Zooplankton, invertebrates, and fish

Table 7-2: Light Sensitive Receptors within the light EMBAs with BIAs or undertaking Biologically Important Behaviour

Receptor	Biologically Important Behaviour
Albatross	
Antipodean albatross	Foraging, feeding or related behaviour likely to occur within area
	Foraging BIA
Black-browed albatross	Foraging, feeding or related behaviour likely to occur within area
	Foraging BIA
Buller's albatross, Pacific albatross	Foraging, feeding or related behaviour likely to occur within area
	Foraging BIA
Campbell albatross, Campbell black-browed albatross	Foraging, feeding or related behaviour likely to occur within area
	Foraging BIA
Gibson's albatross	Foraging, feeding or related behaviour likely to occur within area
Indian yellow-nosed albatross	Foraging BIA
Northern Buller's albatross	Foraging, feeding or related behaviour likely to occur within area
Northern royal albatross	Foraging, feeding or related behaviour likely to occur within area
Salvin's albatross	Foraging, feeding or related behaviour likely to occur within area
Shy albatross	Foraging, feeding or related behaviour likely to occur within area
	Foraging BIA
Southern royal albatross	Foraging, feeding or related behaviour likely to occur within area

Receptor	Biologically Important Behaviour
Wandering albatross	Foraging, feeding or related behaviour likely to occur within area
	Foraging BIA
White-capped albatross	Foraging, feeding or related behaviour known to occur within area
Petrels	
Common diving-petrel	Foraging BIA
Northern giant petrel	Foraging, feeding or related behaviour likely to occur within area
Southern giant-petrel	Foraging, feeding or related behaviour likely to occur within area
White-faced storm-petrel	Foraging BIA
Shearwaters	
Flesh footed shearwater	Foraging, feeding or related behaviour likely to occur within area
Short-tailed shearwater	Breeding known to occur within area
	Foraging BIA
Wedge-tailed shearwater	Foraging, Breeding BIA
Other	
Black-faced Cormorant	Breeding known to occur within area
Little Curlew	Roosting likely to occur within area
Little penguin	Breeding known to occur within area
	Foraging BIA
Orange-bellied parrot	Migration route likely to occur within area
Painted snipe	Roosting likely to occur within area
Swinhoe's Snipe	Roosting likely to occur within area
White-fronted tern	Foraging, feeding or related behaviour likely to occur within area

Albatross

The light EMBA PMST Report (Appendix E. 3) identified likely foraging behaviour for a number of albatrosses. Some of these species have foraging BIAs that the light EMBA overlaps (Table 7-2). These

BIAs are shown in

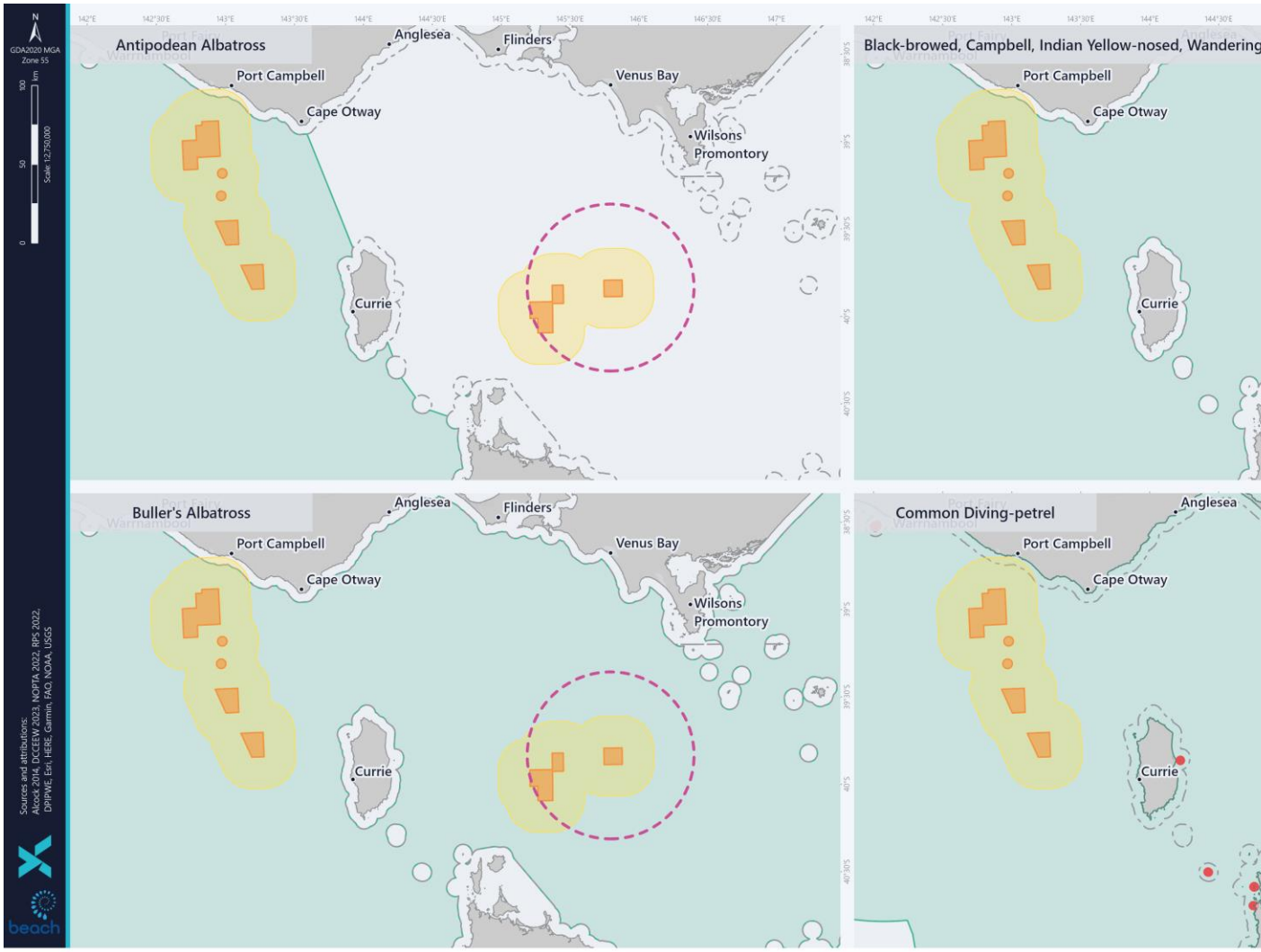


Figure 7-2 and Figure 7-3. Though, the National Recovery Plan for Albatrosses and Petrels 2022 (CoA 2022a) identifies light emissions as a threat, it classifies marine infrastructure interactions including those associated with artificial light as having no risk category priority and affecting 'Nil' species in Australian jurisdiction. In addition, no actions are identified.

All albatross species are migratory with widespread distributions throughout the Southern hemisphere and have been shown to travel large distances when foraging. For example, the wandering albatross has been shown to cover distance between 3,600 and 15,000 km in a single foraging trip during the breeding season on subantarctic islands (Jouventin and Weimerskirch 1990). The recognised foraging BIAs for albatross species generally cover large areas. For example, the entire South-east Marine Region is recognised as a foraging BIA for the Indian yellow-nosed, Campbell and black-browed albatross species (Figure 7-2). Albatrosses forage most actively during daylight and are less active at night because their ability to see and capture prey from the air is reduced (Phalan et al. 2007).

Petrels

The light EMBA intersects a foraging BIA for the common diving petrel and white-faced storm-petrel and foraging, feeding or related behaviour likely to occur for the northern and southern giant petrel.

The BIAs are shown in

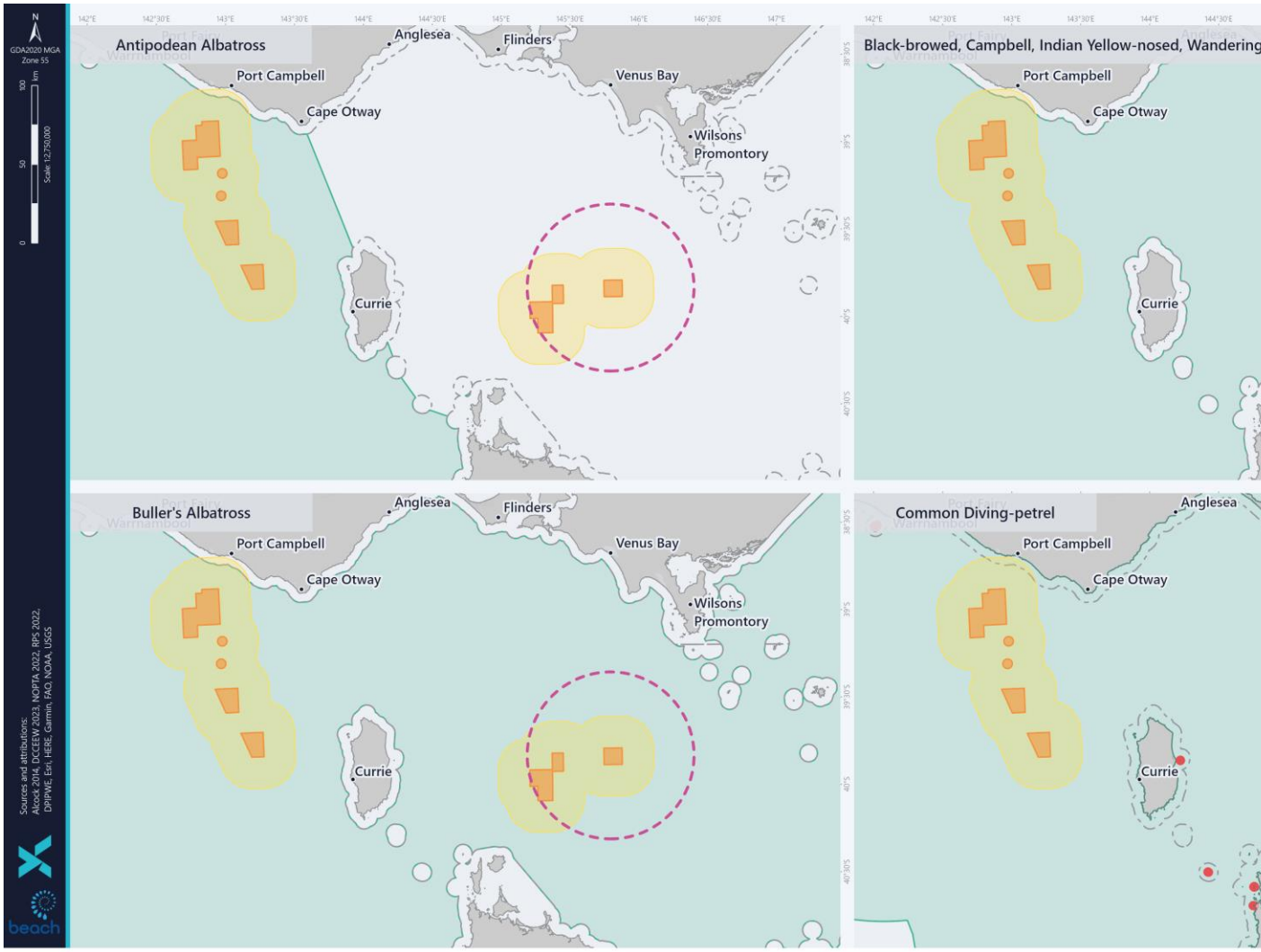


Figure 7-2 and Figure 7-3. Though the National Recovery Plan for Albatrosses and Petrels 2022 (CoA 2022a) identifies light emissions as a threat, it classifies marine infrastructure interactions including those associated with artificial light as having no risk category priority and affecting 'Nil' species in Australian jurisdiction. In addition, no actions are identified.

Petrel species have a widespread distribution throughout the Southern hemisphere, with wide, recognised foraging areas.

The common diving petrel is listed as marine and does not have a recovery plan or conservation advice. Brooke (2004) details that common diving petrels spend the night in burrows during the breeding season and seem to forage mainly during the day, although they also forage at night on vertically migrating plankton. They are thought to be fairly sedentary, remaining more or less in the area of their breeding colony year-round, although they may venture into the open ocean to forage outside of the breeding season and some studies suggest seasonal movements (Brooke 2004).

The northern giant petrel was identified in the light EMBA PMST Report as foraging likely within the light EMBA. It is thought to be a predominantly diurnal forager, but it feeds its chicks during both the day and at night (DCCEEW 2023a). Breeding occurs on Macquarie Island between New Zealand and Antarctica.

The southern giant-petrel was identified in the light EMBA PMST Report as foraging likely within the light EMBA. The southern giant-petrel is listed as endangered. Light is not identified as a key threatening process for the southern giant-petrel (CoA 2022a).

The white-faced storm-petrel is widely distributed throughout Australia, with the Australian population estimated to be about 25% of the global population (CoA 2020a). The species is migratory, moving from their temperate breeding grounds to tropical and subtropical locations in late March (Underwood and Bunce 2004). A foraging BIA for the white-faced storm petrel was identified within the light EMBA PMST report (Figure 7-3). The white-faced storm-petrel is a listed marine species. Light has not been identified as threatening process for this species (DCCEEW 2023c).

Shearwaters

The flesh-footed shearwater was identified in the light EMBA PMST Report as foraging likely within the light EMBA. The flesh-footed shearwater routinely attends fishing vessels to feed on baited hooks, discarded scraps and prey attracted to the surface by such vessels (DCCEEW 2023), thus they may be attracted to lighted water surfaces to forage.

The light EMBA overlaps the short-tailed shearwater foraging BIA (Figure 7-3). The light EMBA PMST Report identified breeding known to occur within the area, but as detailed in Figure 7-3 the light EMBA does not overlap any known breeding sites for the short-tailed shearwater. This species is listed as marine and migratory and does not have a recovery plan or conservation advice. When present in Australian waters (September to May) the species are known to typically forage during daylight, returning to the colonies after feeding at night (AAD 2020)

The light EMBA overlaps the wedge-tailed shearwater breeding and foraging BIAs based around Muttonbird Island, Victoria (Figure 7-3). The species have been recorded to predominantly forage during the day and form large aggregations referred to as “rafts” just offshore from their breeding colony just on dusk and enter and leave the colony at night to avoid predators (Warham 1996). This species is listed as marine and migratory and does not have a recovery plan or conservation advice. Light has not been identified as a threat to this species (DCCEEW 2023b).

Black-faced Cormorant

The light EMBA PMST Report identified breeding known to occur for the black-faced cormorant, a listed marine species. The black-faced cormorant is recognised as a conservation value in the South-east Marine Region (CoA 2015a). They are a large seabird that is endemic to southern Australia and is mostly found along the coasts of Tasmania and Victoria (CoA 2020b). Breeding normally occurs on rocky islands, but also on stacks, slopes and sea cliffs in colonies of up to 2,500 individuals (del Hoyo et al. 1992). It feeds in coastal waters, sometimes in sheltered places in bays and islets and can even be found entering rivers along the coast (CoA 2020b).

Little Curlew

The light EMBA PMST Report identified roosting likely to occur within the area for the little curlew, which is a migratory wetlands species. The little curlew is the smallest curlew. It rarely occurs in Victoria but has been recorded east of Wilson's Promontory and at Lake Tyers, Lake Wellington, and Shallow Inlet, around Port Phillip Bay, and also from lakes in the western Victoria and in the region of Mystic Park (Higgins & Davies 1996). The little curlew breeds from late May to early August, in central and north-east Russia (DoE 2024).

Little Penguin

The light EMBA PMST Report identified breeding known to occur within the area for the little penguin and a foraging BIA. As detailed in Figure 7-4 the light EMBA does not overlap a little penguin foraging or breeding BIA. The impacts from light to little penguins is not assessed further.

Orange-bellied Parrot

The light EMBA PMST Report identified migration route likely for the critically endangered orange-bellied parrot (Figure 7-5). No BIAs or habitat critical to the survival of the species where identified.

The orange-bellied parrot is a ground feeding parrot which breeds in south-west Tasmanian. They migrate from Tasmania to Victoria between late February and early April (Australian Museum 2022b). In Victoria, the orange-bellied parrot mostly occurs in sheltered coastal habitats, such as bays, lagoons, and estuaries, or, rarely, saltworks. The orange-bellied parrot is a ground feeding parrot which breeds in south-west Tasmania between November and March and then overwinters on the coast of south-east mainland Australia between April and October (DELWP 2016). During winter, on mainland Australia, orange-bellied parrots are found mostly within 3 km of the coast (DELWP 2016).

The 2022-23 breeding season showed a record number of 74 orange-bellied parrots return to breeding grounds and production of 59 fledglings, the third highest fledgling production since 2004 (SWIFFT 2023). As of November 2023, 79 individuals had return to breeding grounds the largest number of returns in over 15 years (DNRET 2023).

The orange-bellied parrot recovery plan identifies illuminated structures and illuminated boats as a potential barrier to migration and movement (DELWP 2016). The Drilling Program overlaps the period when orange-bellied parrots migrate between Tasmania and Victoria between late February to early April (Australian Museum 2020).

Painted Snipe

The light EMBA PMST Report identified roosting likely to occur within the area for the painted snipe, which is an endangered, migratory wetlands species. The painted snipe is a stocky wading bird that has been recorded at wetlands in all states of Australia. The painted snipe breeds in shallow wetlands with areas of bare wet mud and both upper and canopy cover nearby (DoE 2024a). Nest records are all, or nearly all, from or near small islands in freshwater wetlands (DoE 2024a). As the light EMBA does not overlap wetlands or nearshore areas (Figure 7-1) it is unlikely to be roosting within the light EMBA. The National Recovery Plan for the Australian Painted Snipe (CoA 2022) does not identify light as a threat.

Swinhoe's Snipe

The light EMBA PMST Report identified roosting likely to occur within the area for Swinhoe's snipe which is a marine and migratory species. Few definite records exist for Swinhoe's snipe in Australia (DoE 2024b). Swinhoe's snipe breeds in central and southern Siberia (DoE 2024b). During the non-breeding season Swinhoe's snipe occurs at the edges of wetlands, such as wet paddy fields, swamps and freshwater streams (DoE 2024b). As the light EMBA does not overlap wetlands or nearshore areas (Figure 7-1) it is unlikely to be roosting within the light EMBA.

White-fronted Tern

The white-fronted tern was identified in the light EMBA PMST Report as foraging likely occurring within the light EMBA. They are a medium sized tern endemic to Australasia breeding in New Zealand and on Flinders and Cape Barren Island off the north-east coast of Tasmania (CoA 2020a). This species can be found in coastal areas, nesting on rocky or sandy beaches and shingle islands in rivers, also on coastal cliffs and deserted barges, often close to the surf (CoA 2020a). The white-fronted tern often feeds in flocks and in winter it feeds over oceanic waters and feeds almost exclusively on fish, but will also take shrimp, feeding in the surf zone or several km out to sea (CoA 2020a).

Zooplankton, Invertebrates and Fish

Normal working lights on marine research vessels—and, by implication, lights from other sources including fishing boats, cargo vessels, recreational watercraft, jetties and oil and gas platforms—have been shown to cause zooplankton and their vertebrate predators to descend away from the surface; these effects occurred at depths of up to 200 m, and up to 200 m horizontally from the light source (Berge et al. 2020). Since most zooplankton need to ascend to forage on phytoplankton near the water's surface, light pollution may lead to an overall reduction in zooplankton, with cascading effects on their predators, and so on up the food chain (CoA 2023).

Fish may be directly or indirectly attracted to lights. Experiments using light traps have found that some fish and zooplankton species are attracted to light sources (Meekan et al. 2001), with traps drawing catches from up to 90 m (Milicich et al. 1992). Lindquist et al. (2005) concluded from a study of larval fish populations around an oil and gas platform in the Gulf of Mexico that an enhanced abundance of clupeids (herring and sardines) and engraulids (anchovies), both of which are highly photopositive, was caused by the platforms' light fields. The concentration of organisms attracted to light results in an increase in food source for predatory species and marine predators are known to aggregate at the edges of artificial light halos. Shaw et al. (2002), in a similar light trap study, noted that juvenile tunas (Scombridae) and jacks (Carangidae), which are highly predatory, may have been preying upon concentrations of zooplankton attracted to the light field of the platforms. This could potentially lead to increased predation rates compared to unlit areas.

The extent of the impact is predicted to be 200 m from each well and 50 km for flaring at Yolla 7. The consequence is assessed as Minor (1) and is of an acceptable level based on:

- Lighting on the rig and support vessels will be limited to that which is required for navigational and safety purposes.
- Flaring may occur at one well for a maximum of 48 hours.
- During the Beach Otway Drilling Campaign in 2021/2022, no birds were identified to be attracted or grounded due to rig or vessel lighting or due to flaring.
- The National Recovery Plan for Albatrosses and Petrels 2022 (CoA 2022a) identifies light emissions as a threat, it classifies marine infrastructure interactions including those associated with artificial light as having no risk category priority and affecting 'Nil' species in Australian jurisdiction. In addition, no actions are identified.
- Albatross forage most actively during daylight and are less active at night because their ability to see and capture prey from the air is reduced (Phalan et al. 2007).

- The orange-bellied parrot, which is classed as critically endangered, may migrate over the light EMBA between late February and early April and illuminated structures and illuminated boats have been identified as a potential barrier to migration and movement for this species (DELWP 2016).
- As the light EMBA overlaps a number of seabird foraging and breeding BIAs, the migratory route for the critically endangered orange-bellied parrot and areas where birds are likely or known to be foraging, breeding, or roosting, the rig and vessel will have a Lighting Management Plan to minimise external light emissions as required by the National Light Pollution Guidelines.
- Artificial light is listed as a key threat in the Recovery Plan for Marine Turtles in Australia (CoA 2017b), however, no biologically important behaviours, BIAs, or habitat critical to survival for marine turtles were identified within the light EMBA.
- Light pollution is listed as a threat to seabirds in the Wildlife Conservation Plan for Seabirds (CoA 2020a), with potential for consequences affecting individuals but not whole populations.
- No BIAs or spawning areas are identified within the light EMBA for fish or invertebrates.

7.2.5.2 Socio-economic Receptors

Coastal Communities

Light pollution associated with offshore mining operations (including oil and gas) and other offshore activities is listed as a pressure on the conservation values of the South-east Marine Reserve Network within the South-east Commonwealth Marine Reserves Network Management Plan (2013-2023) (DNP 2013). However, the management plan does not list tourism as being impacted.

As shown in Figure 7-1 no coastal communities are within the light EMBA, and tourism activities are not likely to be undertaken at night within the light EMBA.

Fisheries

The light EMBA overlaps a small area of low and medium fishing intensity for the Southern Squid Jig Fishery (Figure 7-6). This fishery targets a single species, Gould's squid, using either hand operated or mechanically powered jigs. Squid jigging typically occurs midwater at depths between 50 and 100 m at night using large lights that illuminate the waters around a boat (SETFIA 2023). As squid are attracted to light there is a potential for them to be attracted to the rig and vessel resulting in them not being able to be caught by the fishery.

Phototactic behaviour (the attraction to artificial light) has been observed both in fish and squids with some species known to have a positive phototaxis by moving towards and aggregating in the illuminated zone of artificial lights (Ibrahim and Hajisamae 1999). Hence fishing with artificial lights (surface light) is one of the most advanced and successful methods to increase the catch rate of squid and pelagic fish (Nguyen and Winger 2019). Whilst research into light levels that may attract squid species is limited, Ibrahim and Hajisamae (1999) found optimal levels to attract big fin reef squid (*Sepioteuthis lessoniana*) varied between 1.5 and 25 Lux and the mitre squid (*Loligo chinensis*) between 1.5 and 22.5 Lux. In Nguyen and Winger (2019) Japanese squid (*Todarodes pacificus*) are shown to have a preferred range of approximately 10 Lux but were also shown to aggregate to levels as low as 0.0034 Lux. Modelling by ConocoPhillips (2023), for the same rig and vessels that will be used for the

Drilling Program, showed that light emissions from routine operations will reach intensity levels of 1.5 Lux within 300 m of the light source.

The extent of the impact is predicted to be up to 20 km from each well and 50 km for flaring at Yolla 7 (contingency). The consequence is assessed as Minor (1) and is of an acceptable level based on:

- Lighting on the rig and support vessels will be limited to that which is required for navigational and safety purposes.
- Flaring may occur at one well for a maximum of 48 hours.
- There are no coastal communities within the light EMBA.
- Tourism activities are not likely to be undertaken at night within the light EMBA.
- Squid targeted by the Southern Squid Jig Fishery may be attracted to the rig and vessels but will be available to the fishery when they move outside of the rig 500 m petroleum safety zone. The light EMBA overlaps a small proportion of the fishery and only when wells are being drilling within the Otway Vic/P43 and Vic/P73 for up to five wells.
- The rig and vessel will have a Lighting Management Plan to minimise external light emissions as required by the National Light Pollution Guidelines.

7.2.5.3 Conservation Values and Sensitivities

The light EMBA PMST Report identified two Australian Marine Parks and two State marine protected areas (Table 7-3). As detailed in Table 7-3 and Figure 7-7 the Arches Marine Sanctuary is 560 m outside of the light EMBA. Two terrestrial parks, Port Campbell National Park and Bay of Islands Coastal Park, were identified from the light EMBA PMST Report, however as detailed in Figure 7-1 the light EMBA does not intersection with any shoreline.

In addition the West Tasmania Canyon KEF overlaps the light EMBA (Figure 7-7).

The 50 km flaring EMBA does not overlap any protected areas.

Table 7-3: Light EMBA and Marine Protected Areas

Marine Protected Area		Intersection with light EMBA	% Intersection with light EMBA	Distance to light EMBA
Boags	Multiple Use Zone	✓	18.94	-
Zeehan	Multiple Use Zone	✓	59.88	-
	Special Use Zone	✓	1.10	-
Twelve Apostles Marine National Park		✓	35.30	-
The Arches Marine Sanctuary		-	-	560 m

Light emissions associated with offshore mining operations and other offshore activities is listed as a pressure on the conservation values of the South-east Marine Region (DNP 2013). As described in Section 6.2.2, conservation values for both the Boags and Zeehan AMPs include seafloor features, and habitat for conservation significant bird and marine mammal species (DNP 2013). Species known to

forage within the Boags AMP include the shy albatross and the common diving petrel. In addition Boags AMP values include BIAs for black-browed albatross, Buller's albatross, Campbell albatross, Indian yellow-nosed albatross, shy albatross, wandering albatross, little penguin, short-tailed shearwater, common diving petrel and white-faced storm petrel. The species known to forage within the Zeehan AMP include the black-browed, wandering, and shy albatrosses. In addition Zeehan AMP values include BIAs for Antipodean albatross, black-browed albatross, Buller's albatross, Campbell albatross, Indian yellow-nosed albatross, shy albatross, wandering albatross, short-tailed shearwater, wedge-tailed shearwater, common diving petrel and white-face storm petrel. Evaluation of light on these bird species is assessed in Section 7.2.5.1.

Light emissions are not identified as a key management objective for conservation of natural values associated the Twelve Apostles Marine National Park (Parks Victoria 2006b). Conservation values for the Twelve Apostles Marine National Park are detailed in Section 6.2.8. Light sensitive receptors relevant to the values of the Twelve Apostles Marine National Park are invertebrates and fish. Based on the evaluation of light on ecological receptors in Section 7.2.5.1, impacts to invertebrates and fish within the Twelve Apostles Marine National Park are not predicted based on impacts to invertebrates and fish from light is only predicted up to 200 m from the light source and the Operational Area where rig and vessel lighting will occur is ~18 km from the Twelve Apostles Marine National Park.

The light EMBA overlaps the West Tasmania Canyon KEF for wells within T/30P. The values associated with the West Tasmania Canyon KEF are described in Section 6.2.15.6 with light sensitive receptors being fish associated with sponges near canyon heads. Impacts to fish within the West Tasmania Canyon KEF are expected to be low based the greatest diversity is between 200 m and 350 m depth (CoA 2015a) and as detailed in Section 7.2.5.1 impacts to fish from light are not predicted in water depths greater than 200 m.

The extent of the impact is predicted to be up to 20 km from each well. The consequence is assessed as Minor (1) and is of an acceptable level based on:

- Lighting on the rig and support vessels will be limited to that which is required for navigational and safety purposes.
- Flaring may occur at one well, Yolla 7, for a maximum of 48 hours (contingency only).
- The 50 km flaring EMBA does not overlap any protected areas or KEFs.
- The National Recovery Plan for Albatrosses and Petrels 2022 (CoA 2022a) identifies light emissions as a threat, it classifies marine infrastructure interactions including those associated with artificial light as having no risk category priority and affecting 'Nil' species in Australian jurisdiction. In addition, no actions are identified.
- Albatross forage most actively during daylight and are less active at night because their ability to see and capture prey from the air is reduced (Phalan et al. 2007).
- As the light EMBA overlaps a number of seabird foraging and breeding BIAs, the migratory route for the critically endangered orange-bellied parrot and areas where birds are likely or known to be foraging, breeding, or roosting, the rig and vessel will have a Lighting Management Plan to minimise external light emissions as required by the National Light Pollution Guidelines.

- Light pollution is listed as a threat to seabirds in the Wildlife Conservation Plan for Seabirds (CoA 2020a), with potential for consequences affecting individuals but not whole populations.
- Impacts to invertebrates and fish associated with the Twelve Apostles Marine National Park and West Tasmania Canyon KEF are not predicted based on light impacts to invertebrates and fish at a distance of 200 m.

7.2.5.4 Cultural Values and Sensitivities

From Section 6.6.3, the following cultural values and sensitivities have been identified as potentially affect by light:

- Birds including orange-bellied parrot and short-tailed shearwater (muttonbird).
- Fish.
- Eels.

Section 7.2.5.1 details the predicted environmental impact to these receptors. Based on that assessment the severity of impact to cultural values and sensitivities from light is assessed as Minor (1) and of an acceptable level based on:

- Lighting on the rig and support vessels will be limited to that which is required for navigational and safety purposes.
- Flaring may occur at one well for a maximum of 48 hours.
- There are no coastal communities within the light EMBA.
- During the Beach Otway Drilling Campaign in 2021/2022, no birds were identified to be attracted or grounded due to rig or vessel lighting or due to flaring.
- The National Recovery Plan for Albatrosses and Petrels 2022 (CoA 2022a) identifies light emissions as a threat, it classifies marine infrastructure interactions including those associated with artificial light as having no risk category priority and affecting 'Nil' species in Australian jurisdiction. In addition, no actions are identified.
- Albatross forage most actively during daylight and are less active at night because their ability to see and capture prey from the air is reduced (Phalan et al. 2007).
- The orange-bellied parrot, which is classed as critically endangered, may migrate over the light EMBA between late February and early April and illuminated structures and illuminated boats have been identified as a potential barrier to migration and movement for this species (DELWP 2016).
- As the light EMBA overlaps a number of seabird foraging and breeding BIAs, the migratory route for the critically endangered orange-bellied parrot and areas where birds, including muttonbirds, are likely or known to be foraging, breeding, or roosting, the rig and vessel will have a Lighting Management Plan to minimise external light emissions as required by the National Light Pollution Guidelines.

- Light pollution is listed as a threat to seabirds in the Wildlife Conservation Plan for Seabirds (CoA 2020a), with potential for consequences affecting individuals but not whole populations.
- No BIAs or spawning areas are identified within the light EMBA for fish or invertebrates and the area (200 m) where invertebrates may be attracted to light is small and temporary.
- Koster et al. (2021) who tracked the Australasian short-finned eels off Victoria, detailed that mean night-time swimming depth of all eels showing diel vertical migration in time with the phase of the moon, with the mean depth increasing with increasing moon irradiation. As anguillid eels do not feed during their spawning migration, it has been suggested that the function of the vertical migrations relates to predator avoidance, swimming efficiency, thermal regulation, and control of maturation. Thus, it would seem that short-finned eels move away from rather than be attracted to light when migrating.

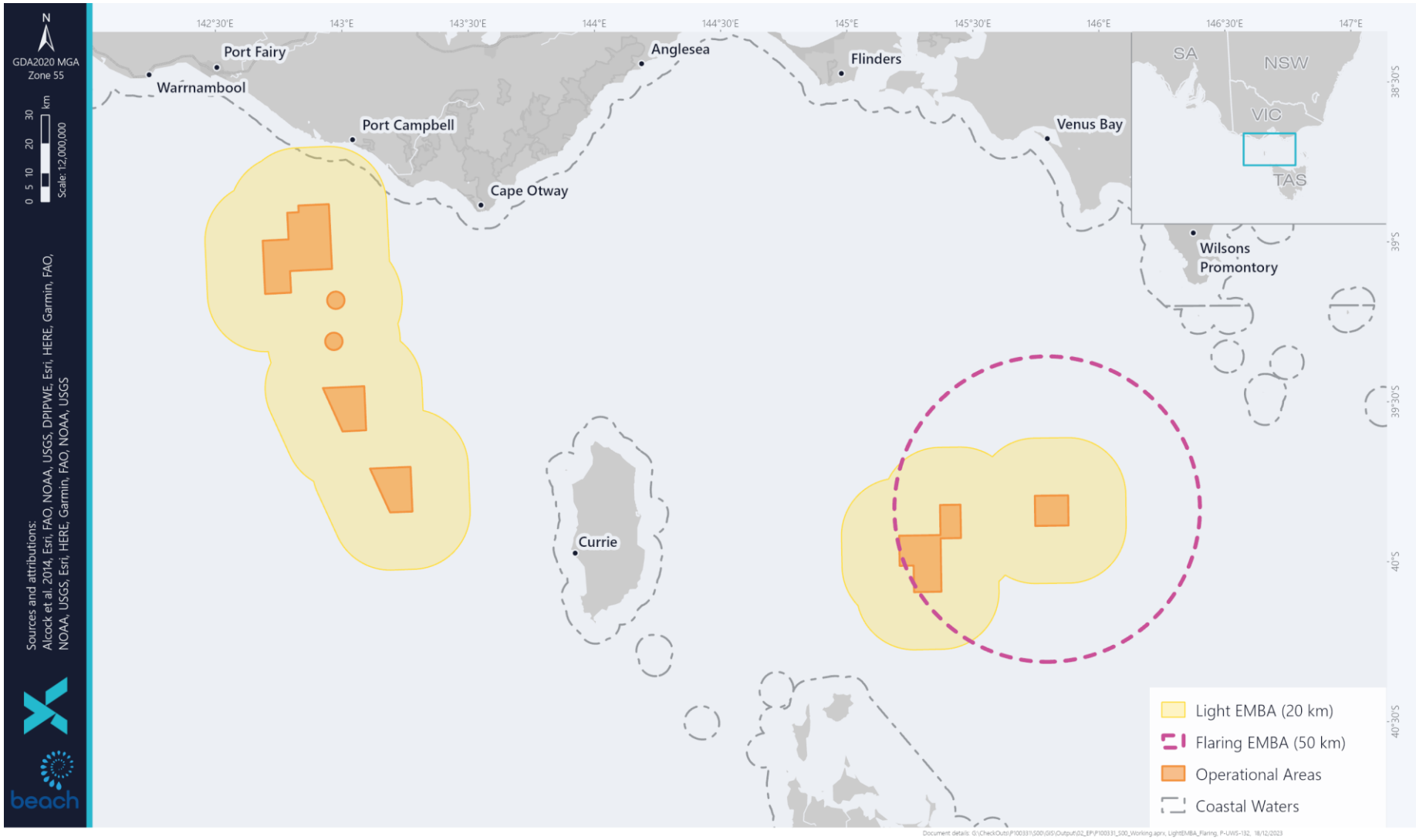


Figure 7-1: Light EMBA

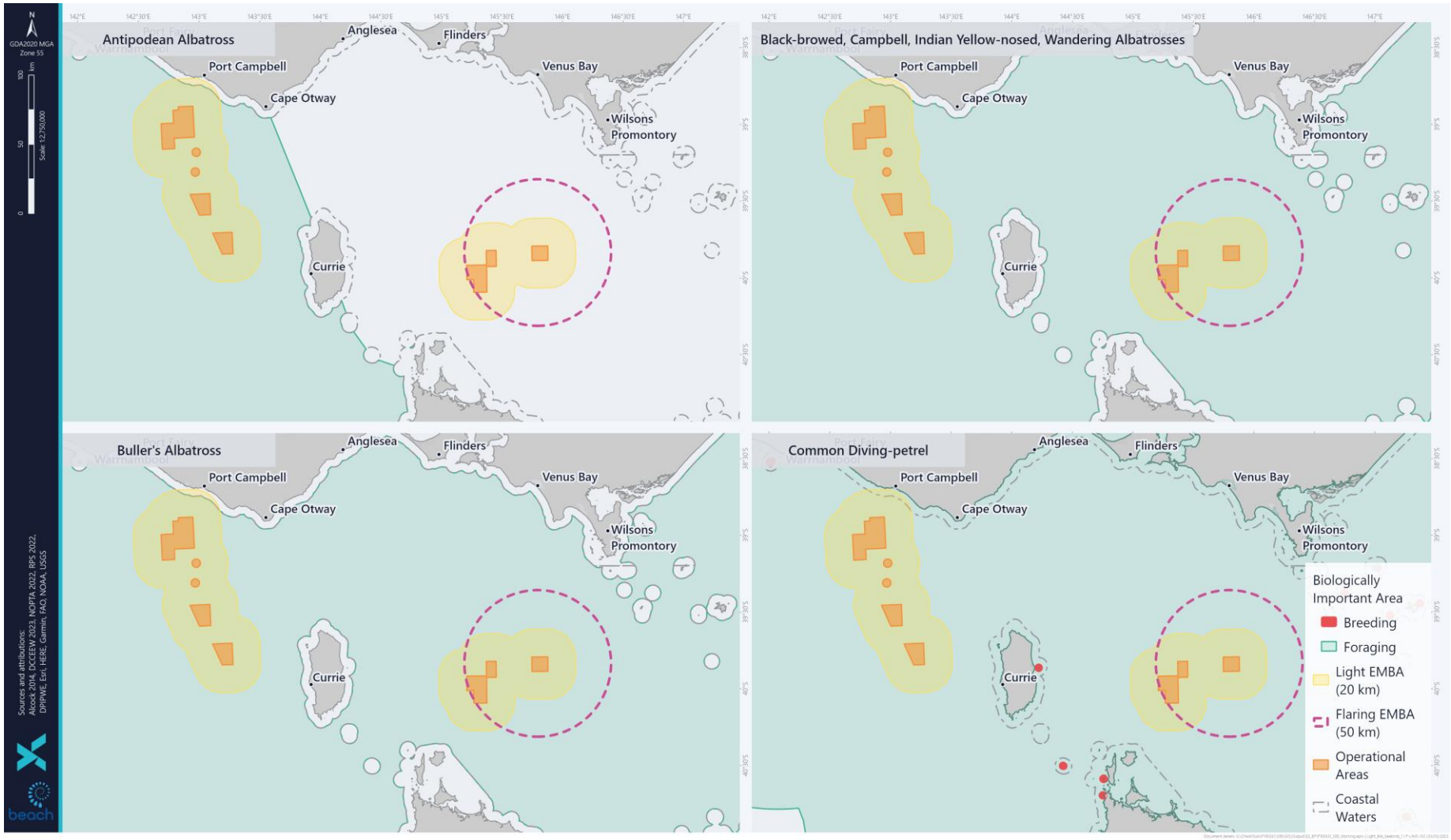


Figure 7-2: Light EMBA and BIAs for Antipodean Albatross, Buller's, Black-browed Albatross, Campbell Albatross, Indian Yellow-nosed Albatross, Wandering Albatross and Common Diving-petrel.

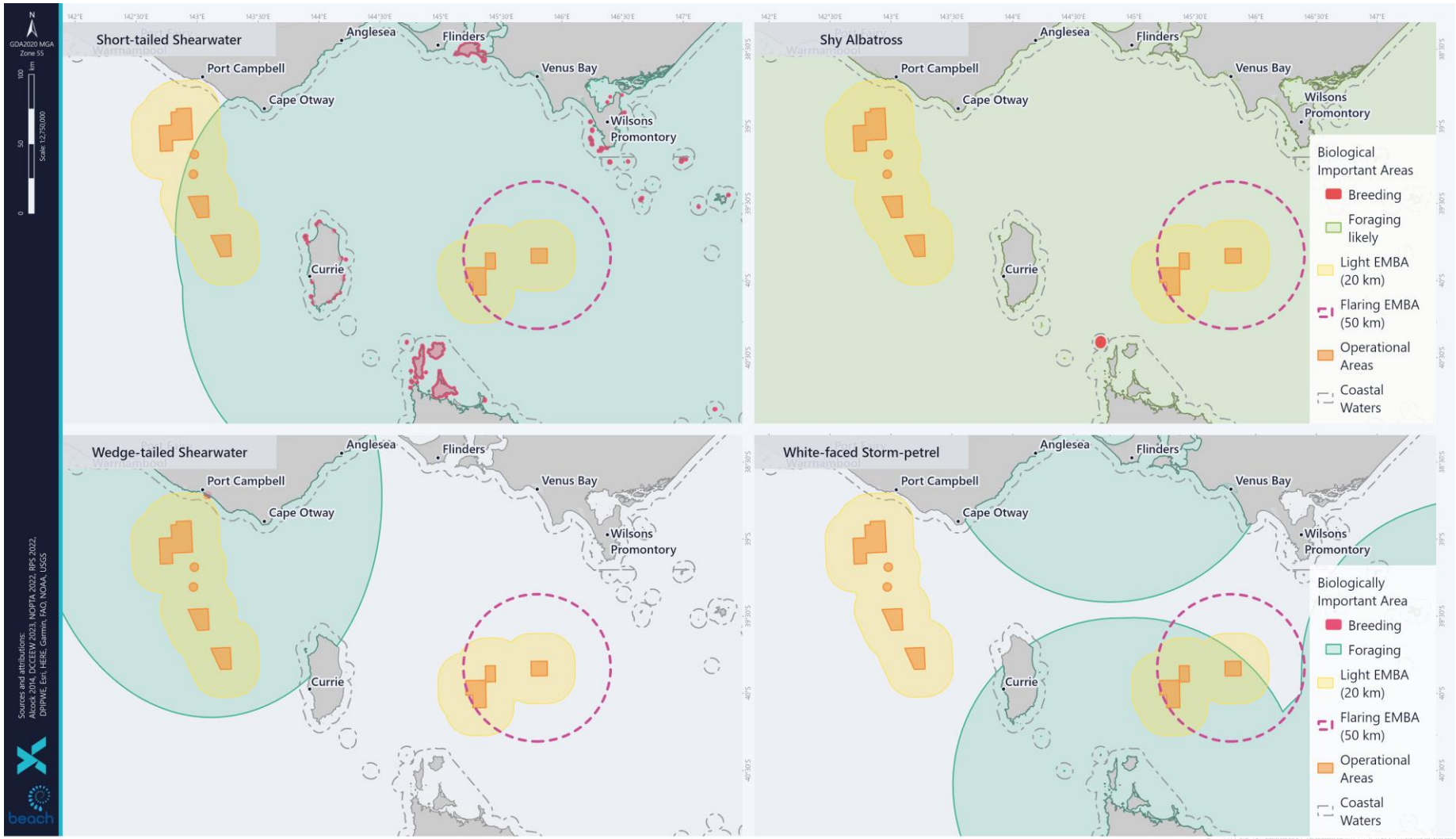


Figure 7-3: Light EMBA and BIAs for Short-tailed Shearwater, Shy Albatross, Wedge-tailed Shearwater and White-faced Storm Petrel

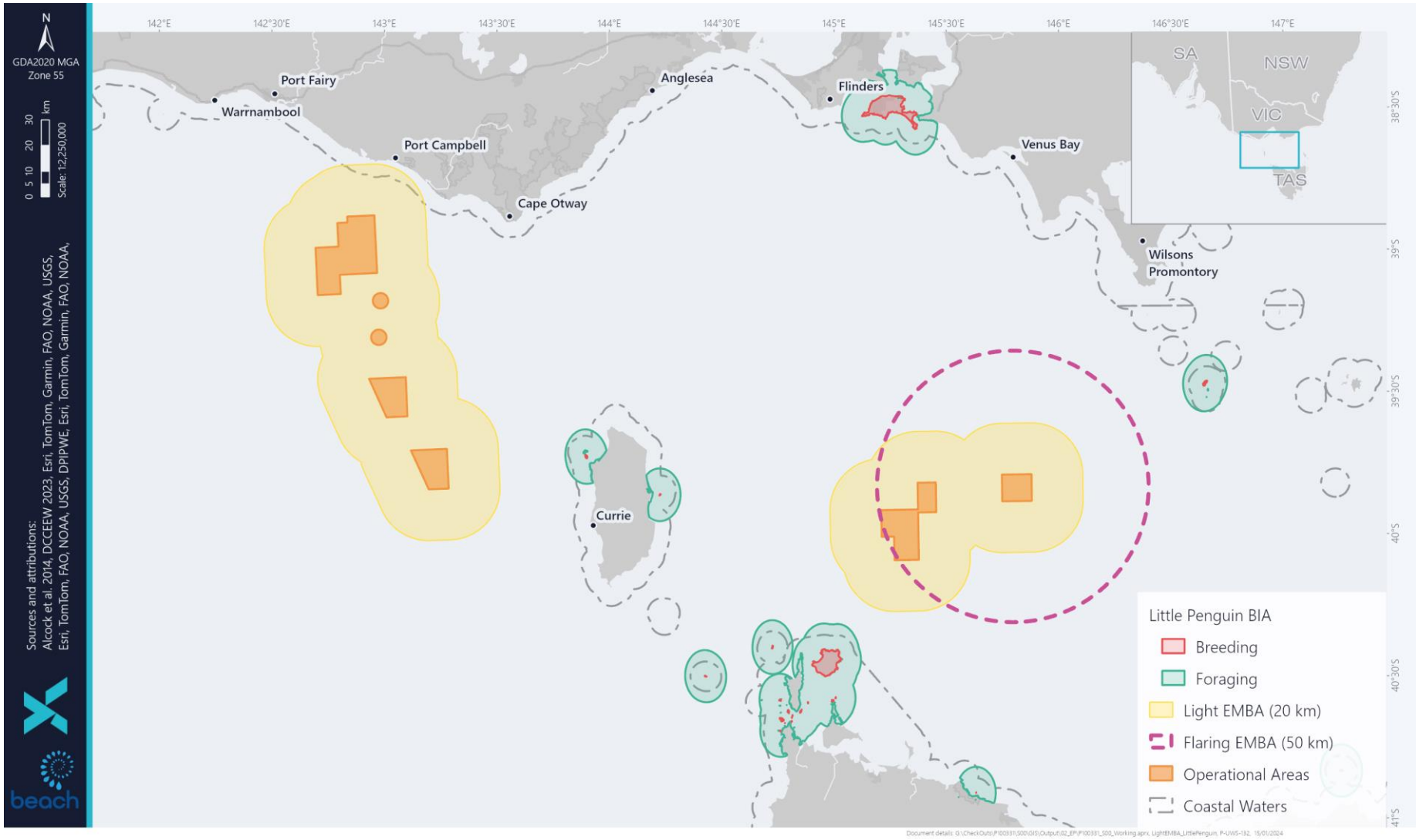


Figure 7-4: Light EMBA and BIAs for Little Penguin

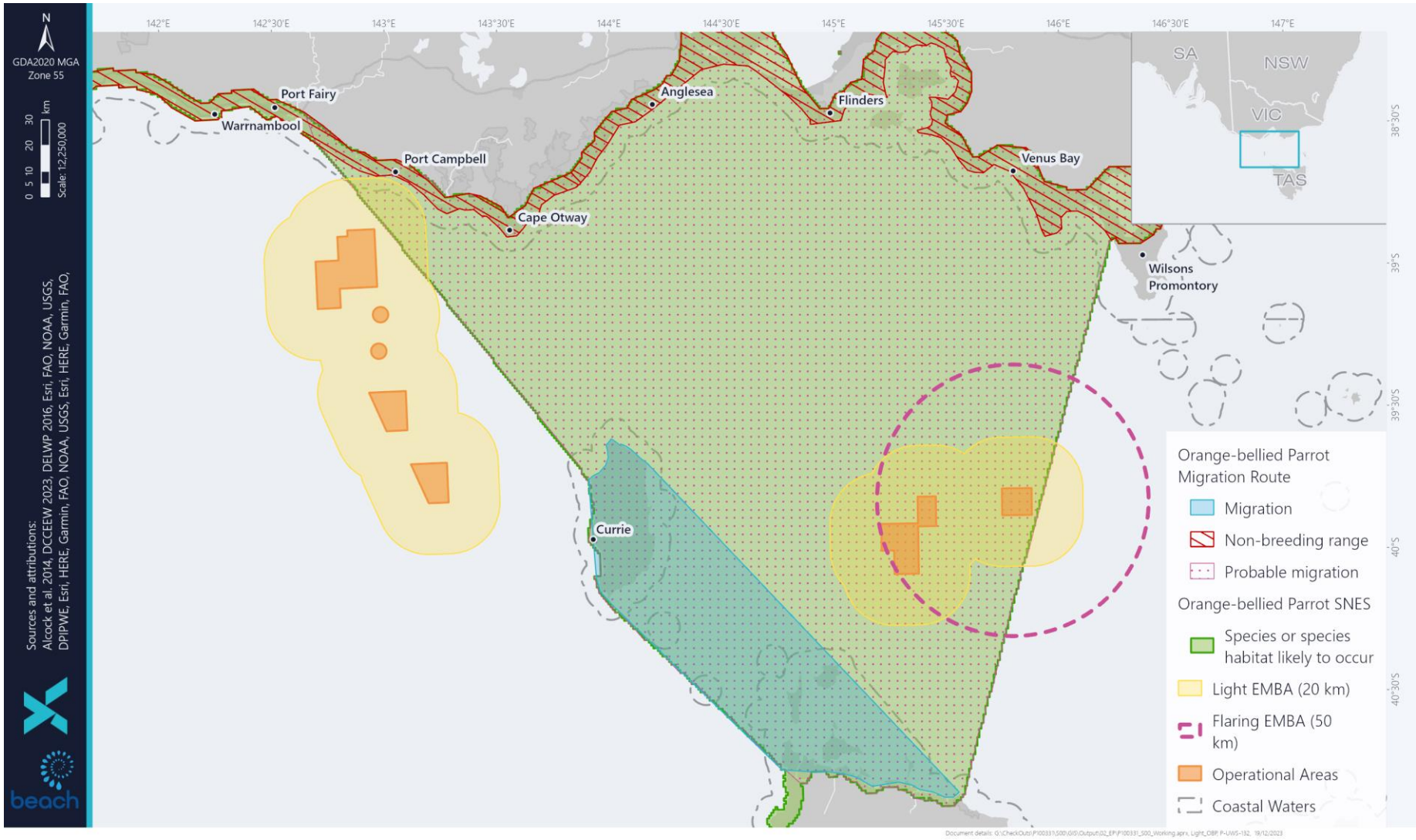


Figure 7-5: Light EMBA and Orange-bellied Parrot Migration Route

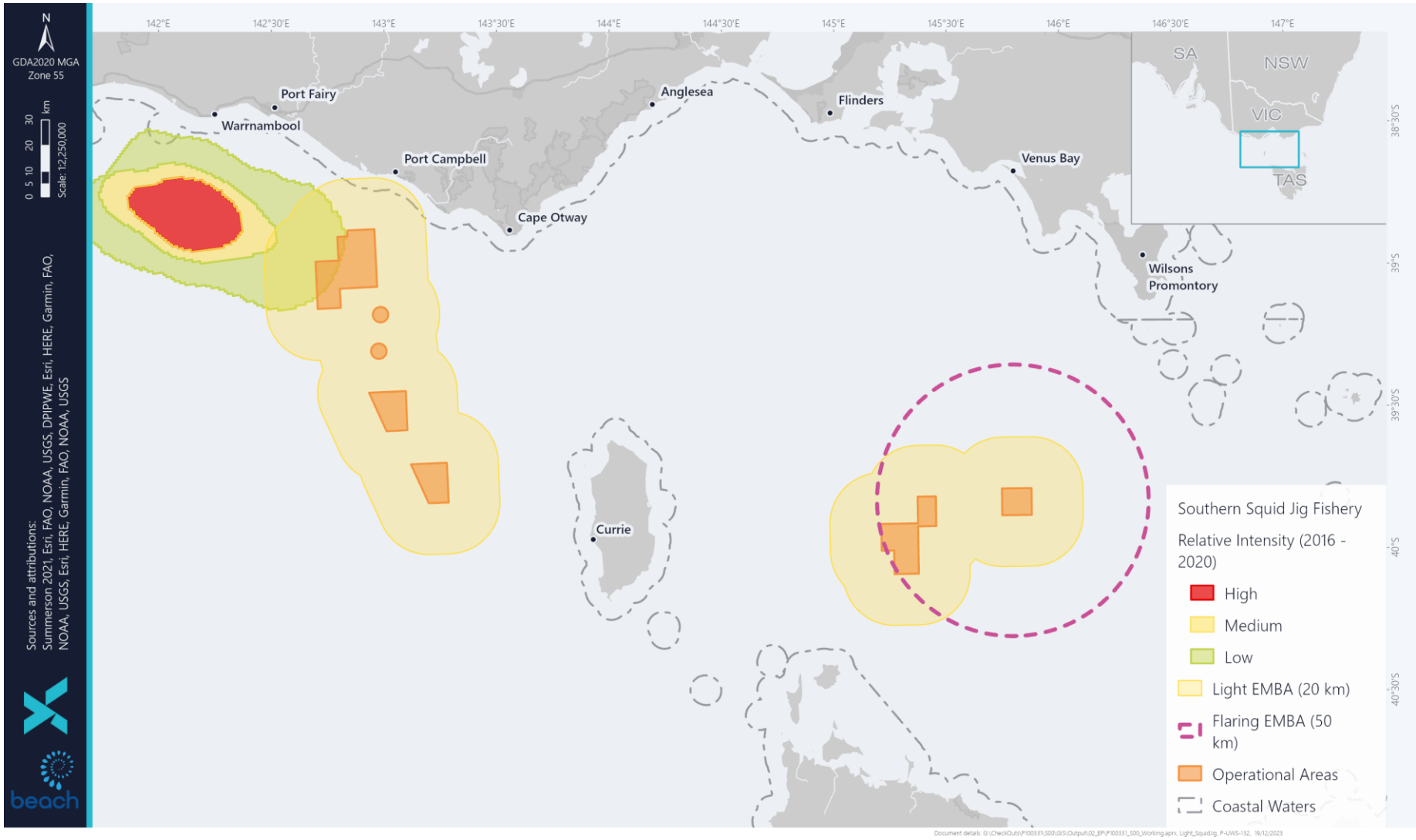


Figure 7-6: Light EMBA and Southern Squid Jig Fishing Intensity

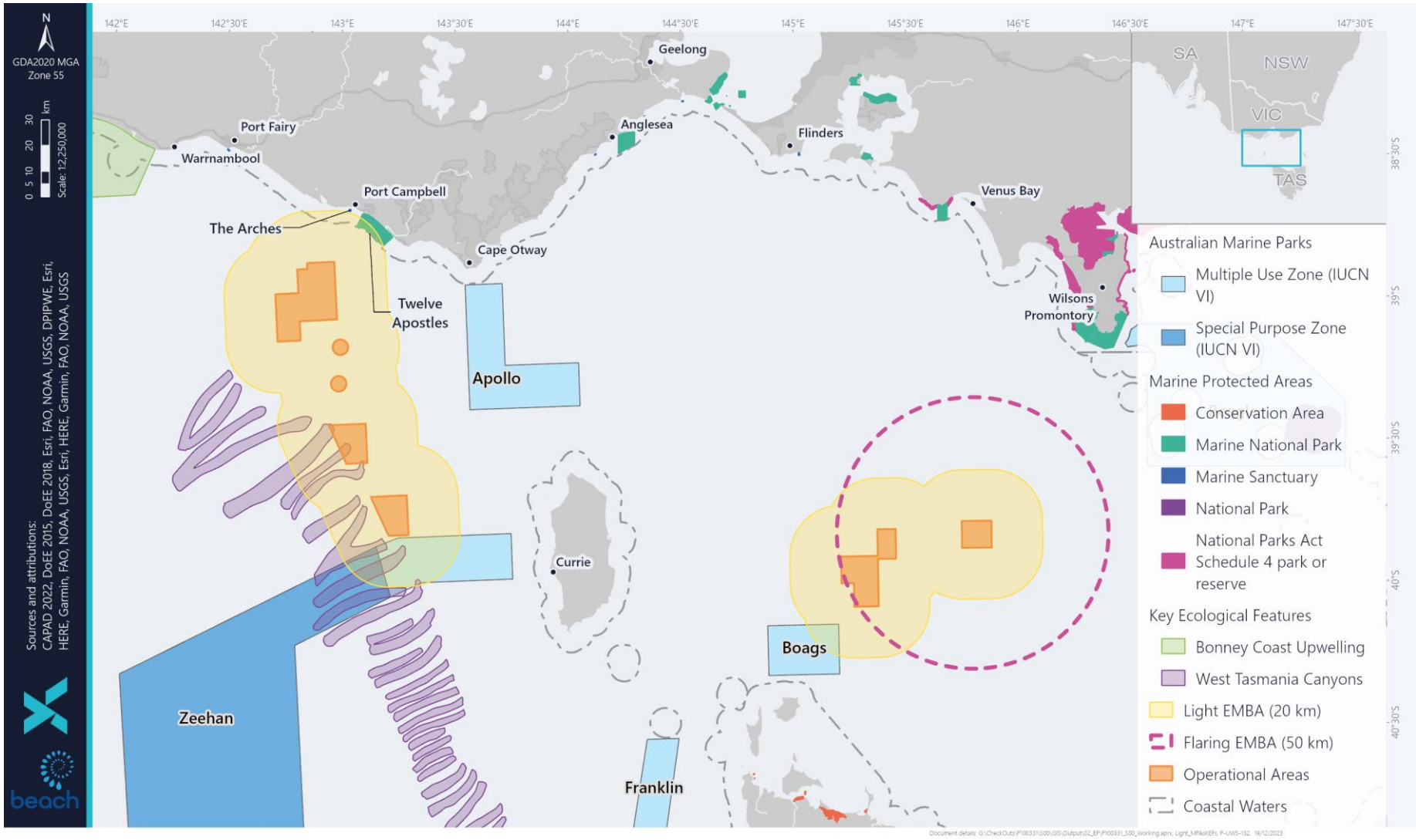


Figure 7-7: Light EMBA and Australian and State Marine Protected Areas, and KEFs

7.2.6 Demonstration that Impacts will be ALARP

ALARP decision context and justification	ALARP Decision Context: Type A Impacts from light emissions are relatively well understood though there is the potential for uncertainty in relation to the level of impact. Activities are well practised, and there are no conflicts with company values, no partner interests and no significant media interests. Additional controls may be required to ensure impacts can be managed to an acceptable level.
Adopted Control Measures	**Description**
CM01: Marine Assurance Process	The rig and vessels will meet relevant maritime laws and includes pre-commencement rig and vessel inspections of class certification requirements under the Navigation Act 2012 and associated Marine Orders. Marine Orders 21 and 30 for the safety of navigation and prevention of collisions require that onboard navigation, watchkeeping, radar equipment, and lighting meets the International Rules for Preventing Collisions at Sea (COLREGs) and industry standards. In addition, workplace lighting is required to support safe working conditions at night in accordance with health and safety requirements.
CM07: Light Management Plan	The National Light Pollution Guidelines for Wildlife (CoA 2023) provide management options for mitigating the effect of light to seabirds. A review of the management options relevant to the Drilling Program is provided in the additional controls section, noting that the light EMBA does not overlap any bird rookeries or nesting areas. Beach will contract a suitably qualified specialist to develop and support the implementation of a Light Management Plan as per the National Light Pollution Guidelines for Wildlife (CoA 2023). Once safety navigational lighting requirements are met (as per vessel class), the Light Management Plan will detail additional mitigations to ensure artificial lighting is reduced to minimum levels based on the information in the Seabird Light Mitigation Toolbox (CoA 2023) wherever practicable, whilst maintaining safe working conditions and navigation. Specifically, outwards facing lighting will be reduced to minimum levels, wherever practicable.
CM10: (Contingency) Well Testing Program	Minimise Flaring: Flaring will be limited to a maximum of 48 hours for one well (Yolla 7) if well testing is carried out (contingent activity). Minimise Flaring at Night: Initial flow will be conducted in good visibility conditions as per Beach WECS. A check will be undertaken to ensure no birds are on or near to the flare boom prior to commencing flaring.

Additional Control Measures Assessed		
Control	**Cost/Benefit Analysis**	**Control Implemented?**
Limit or exclude night-time operations	Elimination of work lights associated with routine operations could result in a minor decrease in lighting. Limiting operations to day-time hours would not eliminate the impact of artificial light required for navigation and safe stand-by operations. Restricting night-time operations would increase the duration of the program and the associated HSE impacts and	No

	costs and would be grossly disproportionate the reduction in impact.	
Seasonal timing	Beach has determined that the risk to foraging or migrating birds during the period of the Drilling Program cannot be avoided due to variability in timing of environmentally sensitive periods and unpredictable presence of some species with: • Orange-bellied parrot: late February to early April (Australian Museum 2020). • Common diving petrel: year round (DCCEEW 2023h). • Northern giant petrel: May to October (DCCEEW 2023a) • Short-tailed shearwater: September to April (AAD 2020) Therefore, there is no period where avoidance of both species is possible. In addition, Beach is required to meet its requirements under the OPGGS Act and petroleum licence conditions to explore and development gas reserves within their petroleum titles. Titleholders must also P&A suspended wells to comply with the requirements under section 572 of the OPGGS Act to remove all structures, equipment and other property that is neither used nor to be used in connection with operations authorised by the title. To progress these petroleum activities, Beach is planning a rig campaign commencing no earlier than November 2024 (subject to rig availability). This rig campaign will be shared across Beach's Bass and Otway assets, along with other titleholders who also have drilling activities planned in the region. A rig has been secured by Beach along with three other consortium members operating in the Otway Basin. The driver behind the consortium approach is to realise efficiencies through the execution of multiple wells in one campaign, reducing mobilisation and demobilisation activities and shared use of aviation and shore base support. Being part of a consortium also provides the flexibility to negotiate rig slot sequencing with other operators therefore optimising rig utilisation and minimising down-time. As the Drilling Program could take up to 560 days there will be some overlap with periods when foraging or migrating birds will be within the light EMBA. Controls have been identified to ensure lighting is reduced to that for safe operations. In addition, during the Beach Otway Drilling Campaign in 2021/2022, no birds were identified to be attracted or grounded due to rig or vessel lighting or due to flaring. In 15 years of Beach operating the Thylacine-A Wellhead Platform no orange-bellied parrots have been recorded. In addition, no orange-bellied parrots were observed during the Otway Phase 4 or Phase 5 offshore campaigns. Avoiding the orange-bellied parrot migration is not commensurate to the level of impacts predicted. Other species are present all year round or for large portion of the year or do not forage at night thus restricting the period when activities will occur does not afford any benefit to these species.	No

Change lighting types aboard the rig and vessels to those with less impact (e.g. use of motion sensors / timers, change colour of lights, reduced intensity, and frequency of lighting)	Changing the colour, intensity, frequency and/or positioning of lighting could potentially reduce the adverse impacts of artificial light on certain fauna. Navigation lighting colours and minimum lighting for crew safety are stipulated by law. Given the variety of marine fauna that may be present and their varying sensitives to different light wavelengths, the control measure is not regarded as being practical and is likely to be of minimal overall benefit. During the Beach Otway Drilling Campaign in 2021/2022, no birds were identified to be attracted or grounded due to rig or vessel lighting. The costs of replacing lighting are considered grossly disproportionate to the benefit gained.	No
Vessels maintain a dark zone between the orange-bellied parrot migration pathway and the light sources during migration season.	Position of vessels is determined by safe operational requirements. Evaluation of trade-offs indicates an unacceptable navigation and safety risk associated with the establishment of dark zones. Further, repositioning is likely to result in only minor reductions in light emissions. The HSE trade-offs are considered grossly disproportionate to the benefit gained.	No
Reduce unnecessary outdoor deck lighting on all vessels and permanent and floating oil and gas installations in known seabird foraging areas at sea.	The Light Management Plan will include requirements to minimise non-essential lights and outward facing lights ensuring safety navigational lighting and safe work condition requirements are met.	Yes CM07: Light Management Plan
Vessels working in seabird foraging areas during breeding season should implement a seabird management plan to prevent seabird landings on the ship, manage birds appropriately and report the interaction.	A rescue program will not prevent birds grounding, but it has been proven useful to reducing mortality of seabirds, and therefore, an environmental benefit. Preparedness for handling will also reduce safety risks to personnel. Administrative costs of incorporating this program into induction package and implementation throughout activity. The Light Management Plan will include a program for handling grounded birds and reporting requirements.	Yes CM07: Light Management Plan
Do not flare.	Well testing is a contingency for the Yolla 7 well and may be required to remove well construction fluid, so this is not received by the Yolla A platform and the Lang Lang Gas Plant, and if necessary, undertake production testing to evaluate the reservoir potential and understand reservoir fluid properties. No birds where grounded or attracted to the flare during the Beach Otway Drilling Campaign in 2021/2022. As flaring is a contingency and if undertaken will be for up to 48 hours the cost of downtime for two 12 hour periods is disproportionate to the benefits as it is unlikely that birds are attracted to the flare.	No
Limit flaring to daylight hours only.	Limiting flaring to day-time hours would eliminate the impact of artificial light from flaring during night-time hours when light is most apparent and potential impacts are greatest. No birds where grounded or attracted to the flare during the Beach Otway Drilling Campaign in 2021/2022.	No

	As flaring is a contingency and if undertaken will be for up to 48 hours the cost of downtime for two 12 hour periods is disproportionate to the benefits as it is unlikely that birds are attracted to the flare.

7.2.7 Demonstration that Impacts will be of an Acceptable Level

Consequence rating	Minor (1)
Likelihood of occurrence	NA
Residual risk	NA
Acceptability Assessment	
To meet the principles of ESD	Light emissions were assessed as having a Minor (1) consequence which is not considered as having the potential to result in serious or irreversible environmental damage. There is high confidence in the predicted level of impact as Beach has significant experience operating in the Otway and Bass based on their existing offshore developments and associated activities including the Beach Otway Drilling Campaign in 2021/2022.
Internal context	The proposed management of the impact is aligned with the Beach Environment Policy. Activities will be undertaken in accordance with the Implementation Strategy (Section 8).
External context	There have been no stakeholder objections or claims regarding light emissions.
Other requirements	Light emissions will be managed in accordance with the National Light Pollution Guidelines for Wildlife (CoA 2023). The Guidelines recommend: • Infrastructure with artificial lighting that is externally visible should have best practice lighting design implemented. • Where there is important habitat for seabirds within 20 km of a project, an EIA should be undertaken. These requirements are met by this impact assessment and the implementation of CM07: Light Management Plan. Light pollution is identified as a threat in the Wildlife Conservation Plan for Seabirds (CoA 2020a) and with the following actions relevant to light: • Manage the effects of anthropogenic disturbance to seabird breeding and roosting areas. • Ensure all areas of important habitat for seabirds are considered appropriately and consistently in the development assessment process. This requirement is met by this impact assessment and the implementation of CM07: Light Management Plan. The light EMBA does not overlap any seabird breeding and roosting areas. Light emissions are identified as a threat in National Recovery Plan for Albatrosses and Petrels 2022 (CoA 2022a) however, no actions are identified. The implementation of vessel Light Management Plans will ensure that lighting is of a level that will not impact on the recovery of threatened albatrosses or petrels. The National Recovery Plan for the Orange-bellied Parrot (DELWP 2016) identifies illuminated boats and structures as a threats with the action of assess the risk from barriers on the migration route. With the action of manage threat if the risk rating warrants action. This requirement is met by this impact assessment and the implementation of CM07: Light Management Plan.

	The Wildlife Conservation Plan for Migratory Shorebirds (DoE 2015b) identifies light as part of anthropogenic disturbance as threat but has no actions. The National Recovery Plan for the Australian Painted Snipe (CoA 2022) does not identify light as a threat. There are no other recovery plans, conservation advice or listing advice for seabirds within the light EMBA.
Monitoring and reporting	Reporting of injury to or death of EPBC Act-listed species will be undertaken as detailed in Section 8.3.1.
Acceptability outcome	**Acceptable**

7.3 Atmospheric Emissions

7.3.1 Source of Aspect

Atmospheric emissions are generally considered to be any emission or entrainment process from a point, non-point or mobile sources that results in air pollution. This includes pollutants associated with greenhouse gas (GHG) emissions. With regards to the Drilling Program these emission sources include:

- Rig and vessel fuel use.
- Helicopter fuel use.
- Flaring operations as a part of flow-back and well testing. Flaring is a contingency for one well (Yolla 7).
- Venting of rig dry bulk storage tanks during transfer of bulk dry barite, bentonite, and cement from the vessel to the rig.
- Fugitive emissions - very small volumes of gases or vapours are released from pressure-containing equipment such as valves, piping flanges, pumps, storage tanks, compressors, etc. on the rig and vessels. Volumes are kept to a minimum through upkeep of machinery aboard the rig and vessels, during implementation of the planned maintenance system.

7.3.2 Extent and Duration of Aspect

Vessel and Drill Rig Operations - Drilling	
Extent	Operational Area Based on the furthest distance of impact.
Duration	560 days Continuous atmospheric emissions will be generated by power generation on the vessels and rig.
Flaring (Yolla-7 contingency only)	
Extent	Yolla 7 Operational Area
Duration	48 hours

7.3.3 Predicted Environmental Impacts

The release of atmospheric emissions (gaseous GHG emissions), such as carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O), along with non-GHG emissions, such as sulphur oxides (SOx) and nitrogen oxides (NOx), can result from the operation of the rig and vessel engines, helicopters, generators, fixed plant, equipment and during flaring. Small quantities of dry barite, bentonite and cement will also be released whilst the holding tanks are venting after the transfer of bulk solids.

The predicted environmental impacts from atmospheric emissions are:

- Atmospheric emissions leading to a change in air quality and an increase in greenhouse gas emission.

7.3.4 EMBA

Predicted impacts from atmospheric emissions associated with the Drilling Program will be limited to the operational area. Receptors which may be affected by atmospheric emissions within the operational area include:

- Air quality
- Seabirds.

The accumulation of GHG emissions in the atmosphere has been shown to contribute to climate change (BOM and CSIRO 2022, IPCC 2022a). Climate change impacts occur at a global scale over a long timeframe and cannot be attributed to any single source of emissions or specific activities.

Climate change associated with an increase in GHG emissions is likely to affect various values and sensitivities within Australia, such as:

- Physical environment such oceanography, water quality, climate.
- Ecological receptors associated with marine, terrestrial and wetland ecosystems.
- Socio-economic receptors such as coastal communities and fisheries.
- Cultural values and sensitivities.

It is important to acknowledge that climate change impacts cannot be directly attributed to any one activity. Rather they are the result of global GHG emissions minus global GHG sinks, that have accumulated in the atmosphere since the industrial revolution began.

7.3.5 Predicted Level of Impact

7.3.5.1 Air Quality

As the Operational Area is away from coastal settlements and given the limited extent of reduced air quality, adverse impact on local or regional biodiversity, ecological integrity, social amenity, or human health is not predicted.

The Operational Area overlaps foraging BIAs for albatross, petrel, and shearwater species. No habitat critical to the survival of birds occur within the Operational Area. As it is unlikely that seabirds would remain close to the emission source for an extended period impacts are not predicted.

Natural gas and diesel combustion, along with venting, will result in gaseous emissions of GHG such as carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). While these emissions add to the atmospheric GHG load, which adds to global warming potential, they are relatively small on a global scale, representing an insignificant contribution to overall GHG emissions. These emissions are not considered to have a determinable local-scale impact and therefore impacts are considered to be low.

The extent of the area of potential impact is predicted to be close to the emission source for the duration of the emission. The consequence is assessed as Minor (1) and is of an acceptable level based on:

- The low level of emissions.

- The open ocean environment and prevailing winds of the Otway and Bass mean that atmospheric emissions will rapidly disperse to background levels close to the emission source.
- Impacts to seabirds are not predicted.
- Impacts to coastal communities are not predicted.

7.3.5.2 Greenhouse Gas Emissions

Direct and indirect greenhouse gas (GHG) emissions have been considered for the Drilling Program. Flaring, which may occur at Yolla-7 during well testing, is the only identified material source of Beach's direct (scope 1) emissions arising from the Drilling Program. Beach reports its Australian scope 1 and scope 2 emissions under the *National Greenhouse and Energy Reporting Act 2007* (NGER), calculated according to the *National Greenhouse and Energy Reporting (Measurement) Determination 2008* (DCCEEW 2022d).

Indirect emissions, from sources not owned or operated by Beach, associated with the Drilling Program include vessels, rig, helicopters, and materials used. These emissions are classified as scope 3 emissions, per the Greenhouse Gas Protocol *"Corporate Accounting and Reporting Standard"* (2004).

The conservative estimate of total greenhouse gas emissions, both direct and indirect, is approximately 150 ktCO_2-e for the Drilling Program (1 November 2024 – 31 December 2028). This estimate is based on conservative assumptions about program conditions, such as the longest possible drilling duration for each well and maximum flaring duration and rate.

The total GHG emissions estimate for the Drilling Program is less than ~0.01% and 0.05% of the Australian and Victorian carbon budgets, respectively, for the duration of the Drilling Program. See the GHG Emissions Technical Summary in Appendix F for details on how this was calculated.

The emissions associated with the Drilling Program are small when compared to national emissions; they are insignificant on a global scale and are not predicted to have determinable impact.

Accidental release and fugitive emissions of ozone-depleting substances (ODS) have the potential to contribute to ozone layer depletion, attributing to increased ultraviolent radiation reaching the earth's surface from the sun, further accelerating global warming and climate change (WMO 2022). Though fugitive emissions are known to occur, given the short duration of the activity and the high energy airshed, the small volume of fugitive emissions will be quickly dissipated and is not considered a risk to air quality.

Physical Environment

Anthropogenic driven climate change has been demonstrated to result in changes in the frequency and intensity of extreme weather events such as droughts, floods, heatwaves, storms, and fire, impacting ecosystem's composition, resilience, and function (IPCC 2022a).

Climate change has been attributed to fundamental changes to the physical and chemical characteristics of the ocean, such as ocean warming, sea levels rising, acidification and deoxygenation (IPCC 2022a). Sea surface temperatures have increased globally over recent decades and are expected to continue to rise. Estimates of warming in the Southern Tasman Sea of between 0.6 to 0.9°C, and between 0.3 to 0.6°C elsewhere along the Australian coast, are predicted by 2030 (Church et al. 2006).

Ecological Receptors

Climate change can result in a range of impacts to specific species, environments, and ecosystems within Australia. It is important to acknowledge that climate change impacts cannot be directly attributed to one activity, as they are the result of global emissions that have accumulated within the atmosphere over time.

The impacts from climate change are highly species-dependent and spatially variable. Some impacts which are already apparent include changes to biodiversity, such as shifts in genetic composition, changes to migration patterns, altered lifecycles and reduced reproduction rates of certain species (Steffen et al. 2009). The increase in the frequency and intensity of extreme weather events has been shown to impact population dynamics, species boundaries, morphology, behaviour, reproduction and ecosystem composition, resilience, and function (IPCC 2022a).

In the marine environment, changes to the physical and chemical characteristics of the environment can result in alterations to species distribution, abundance, seasonal timing, habitat loss, extinction, population declines and increases in the frequency and intensity of thermally induced coral bleaching events (IPCC 2022a, BOM and CSIRO 2022). Increasing acidity, from CO_2 being absorbed by oceans and fresh water, increases the solubility of calcium carbonate, which is the central component of the skeletal material in aquatic organisms (Steffen et al. 2009).

Furthermore, species are globally shifting polewards driven by heat increases, shifts in seasonal timings and ecosystem changes, causing multiple losses of local species, mass mortality events, and loss of specific ecosystems such as kelp forests (IPCC 2022a). The shift will have adverse socio-economic consequences on certain activities which rely on these species such as aquaculture and fisheries.

Socio-economic Receptors

Socio-economic impacts resulting from climate change include impacts to the functions, interests or activities of other users who rely on specific ecological values that may experience adverse impacts, such as commercial and recreational fisheries and aquaculture.

Climate change may impact marine crustacean populations by intensifying habitat loss and interfering with feeding, moulting, reproductive performance, biochemical compositions, behaviour, movement and survival (Azra et al. 2022).

Crustacean responses to climate change vary by species, life-history stage, reproduction status and geographical distribution. For example, research on the southern rock lobster has shown they can increase their resilience to warmer water temperatures (Oellermann et al. 2022). However, the southern rock lobster is restricted by the inability to shift their range further south due to a lack of coastal habitat. Consequently, the main threat from climate change is expected to be climate driven competition with the increasingly abundant eastern rock lobster as it expands its range south (Oellermann et al. 2022).

Conservation Values and Sensitivities

The Zeehan AMP and Apollo AMP are the closest AMPs to the Otway Operational Areas, while the Boags AMP is the closest to the Bass Operational Areas. The values of these marine reserves include ecological receptors that may be sensitive to the impacts of climate change.

The South-east Commonwealth Marine Reserves Network Management Plan does not specify climate change as a main pressure; however, it does identify that the effects are unpredictable and may include shifts in major currents, rising sea levels, ocean acidification and changes in the variability and extremes of climatic features (e.g. sea temperature, winds, and storm frequency and intensity) (DNP 2013). The Plan states that there is a high level of uncertainty about the effects that climate change related pressures will have on the conservation values protected by the South-east Commonwealth marine reserves.

The Arches Marine Sanctuary and Twelve Apostles Marine National Park are the closest state marine protected areas to the Operational Areas. The Great Ocean Road Action Plan which covers the Twelve Apostles Marine National Park, The Arches Marine Sanctuary along with the Great Ocean Road, identifies impacts of climate change to these protected areas.

Whilst the release of GHG emissions is known to contribute to global climate change, the amount estimated to be released as a result of the Drilling Program is insignificant on a global scale and is not expected to have determinable impacts to protected areas.

Cultural Values and Sensitivities

Impacts to cultural heritage sites and places of spiritual importance in coastal locations may also be experienced due to rising sea levels. Sea levels have been estimated to have risen on average by 1.2 mm per year between 1920 and 2000 due to climate change (Church et al. 2006). By 2100, research is expecting sea levels to have increased by a further 18 to 59 cm in response thermal expansion and melting of icesheets (Solomon et al. 2007).

Whilst the release of GHG emissions is known to contribute to global climate change, the amount estimated to be released as a result of the Drilling Program is insignificant on a global scale and is not expected to have determinable impacts.

Summary

For the Drilling Program there is no gas production. Any future offshore gas production to back fill existing production at the Otway and Lang Lang Gas Plants require separate regulatory approvals that include an assessment of direct and indirect GHG emissions.

The consequence severity of GHG emissions from the Drilling Program on the physical, ecological, conservation, socio-economic and cultural receptors and values described above is assessed as Minor (1) and is of an acceptable level based on:

- Although emissions of GHG such as carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) during the activity will add to the GHG load in the atmosphere, they represent an insignificant contribution on a global scale and are not expected to have determinable impacts. Consequently impacts are not predicted to affect:
    - Species with conservation management plans that identify climate change as a threat.
    - Commercially important species, noting that the giant crab and southern rock lobster fisheries in Victoria, and the southern rock lobster fishery in Tasmania having stock listed as a sustainable status (FRDC 2020, 2020a) and neither have a EPBC threatened status, therefore, any minor impact is unlikely to affect the productivity of either population.

- The South-east Commonwealth Marine Reserves Network Management Plan stating that there is a high level of uncertainty around the effects that climate change may have upon the conservation values protected by the reserves (DNP 2013).

- Maintenance of equipment containing ozone depleting substances is controlled to ensure the likelihood of an accidental release or fugitive emissions is minimised.

7.3.6 Demonstration that Impacts will be ALARP

ALARP decision context and justification	**Atmospheric emissions: ALARP Decision Context: Type A.** Impacts from atmospheric emissions are well understood and there is nothing new or unusual. Good practice is defined, and uncertainty is minimal. There are no conflicts with company values, no partner interests, and no significant media interests. No objections or claims where raised by stakeholders in relation to atmospheric emissions. As the impact consequence is rated as Minor (1) applying good industry practice (as defined in Section 2.7.2.1) is sufficient to manage the impact to ALARP. **GHG emissions: ALARP Decision Context: Type B** Impacts from GHG emissions are relatively well understood though there is the potential for uncertainty in relation to the level of impact. Activities are well practised, and there are no conflicts with company values, but there is significant partner and media interest in GHG emissions form oil and gas activities including Beach's activities. Though objections or claims where raised by stakeholders in relation to GHG emissions this was in relation to future development and processing of gas reserves and not specific to the Drilling Program.
Adopted Control Measures	**Source of good industry practice control measures**
CM01: Marine Assurance Process	The rig and vessels will meet relevant maritime laws and includes pre-commencement rig and vessel inspections of class certification requirements under the Navigation Act 2012 and associated Marine Orders. Rig and vessels will comply with Marine Orders – Part 97: Marine Pollution Prevention – Air Pollution (appropriate to vessel class) for emissions from combustion of fuel, including: • Hold a valid Air Pollution Prevention certification or equivalent in accordance with MARPOL Annex VI. • Use low sulphur fuel in accordance with Marine Order 97: Marine Pollution Prevent – Air Pollution (Division 7). • National (AMSA) and International (IMO / MARPOL) Emissions and Discharge Standards for vessels. • Have a Ship Energy Efficiency Management Plan as per MARPOL 73/78 Annex VI. • Engine NOx emission levels will comply with Regulation 13 of MARPOL 73/78 Annex VI. • Only MARPOL VI-approved waste incinerators shall be used to incinerate solid combustible waste (food waste, paper, cardboard, rags, plastics).

	• ODS handling procedures as per MARPOL Annex VI, including maintenance of ODS record book where rechargeable systems containing ODS are recharged or repaired. A Preventative Maintenance System is in place that provides a status on the maintenance of equipment and detailed manufacturer's specification on maintenance procedures for: ◦ Equipment detail as a control in this EP will be inspected to ensure effective operation. ◦ Power generation and propulsion systems on the MODU and vessels will be inspected to ensure efficient operation.
CM02: Vessel and Rig Operating Procedures	Bulk solids transferred in accordance with bulk transfer procedures to reduce the risk of an unintentional release bulk product (powder) to sea during tank venting. The procedures include standards for: • Certified equipment with confirmed integrity (e.g. hose and valves). • Transfer process (e.g. safety, communication, monitoring, inventory, emergency shut down procedures, procedural documents, and spill incident details).
CM10: (Contingency) Well Testing Program	Flaring if undertaken will be limited to a maximum of 48 hours on one well (Yolla 7). A flaring system and air compressors will be used to atomise hydrocarbons to minimise smoke during combustion and aid in the reduction of atmospheric emissions. A minimum standard for the destruction efficiency of the flare will be specified in the minimum equipment requirements.

Additional Controls Assessed		
Control	**Cost/Benefit Analysis**	**Control Implemented?**
Use of low GHG fuels	Vessel that use low GHG fuels are relatively new and are not common in Australian waters. To bring vessels into Australia to support operations is an increased cost. Beach via its Procurement Vetting Process (CM11) assesses suppliers emissions management and via this process would support low emission vessels if available.	Yes – as per CM11: Procurement Vetting Process
Prohibit use of ODS (ozone depleting substances)	Eliminates emissions associated with ODS activities during the Drilling Program. Increase in health risk from storage of wastes. Increase in risk due to transfers (increased fuel usage, potential increase in collision risk, disposal on land).	Reject
No bulk product (powder) transfers	Eliminates impacts to air quality from unintentional release. Bulk product is required to perform the activity and transfers of bulk product are required. Transfer activities are carried out in accordance with rig owner's procedures to reduce the risk of an unintentional release.	Reject

Consequence rating	Minor (1)
Likelihood of occurrence	NA
Residual risk	Low

7.3.7 Demonstration that Impacts will be of an Acceptable Level

Consequence rating	Minor (1)
Likelihood of occurrence	NA
Residual risk	Low
Acceptability Assessment	
To meet the principles of ESD	Air emissions were assessed as having a Minor (1) consequence which is not considered as having the potential to result in serious or irreversible environmental damage. There is high confidence in the predicted level of impact as Beach has significant experience operating in the Otway and Bass based on their existing offshore developments and associated activities including the Beach Otway Drilling Campaign in 2021/2022.
Internal context	The proposed management of the impact is aligned with the Beach Environment Policy, Climate Change Policy, Sustainability Policy, Risk Management Standard, Environment Management Standard and Sustainability Standard as detailed in Section 8. Activities will be undertaken in accordance with the Implementation Strategy (Section 8).
External context	There have been no stakeholder objections or claims regarding atmospheric emissions or GHG emissions associated specifically with the Drilling Program.
Other requirements	The following published material identifies climate change as a threat to the relevant threatened and migratory species within the operational area: • National Recovery Plan for Albatrosses and Petrels (CoA 2022a). • Wildlife Conservation Plan for Migratory Shorebirds (DoE 2015b.) • Conservation Advice for *Ardenna grisea* (sooty shearwater) (DCCEEW 2023l). • National Recovery Plan for the Orange-bellied Parrot *Neophema chrysogaster* (DELWP 2016). • Recovery Plan for Marine Turtles in Australia (CoA 2017b). • Conservation Management Plan for the Blue Whale (CoA 2015) • Conservation Management Plan Southern Right Whale (DSEWPaC 2012a) • Draft National Recovery Plan for the Southern Right Whale (DCCEEW 2022a). • Listing Advice: *Megaptera novaeangliae* Humpback Whale (DAWE 2022a). • Conservation Advice *Balaenoptera borealis* (sei whale) (TSSC 2015g). • Conservation Advice for *Balaenoptera physalus* (fin whale) (TSSC 2015f). • Recovery Plan for the White Shark (*Carcharodon carcharias*) (DSEWPaC 2013a).
Monitoring and reporting	Fuel use and flaring volumes will be recorded as detailed in in Section 8.3.8. Atmospheric and GHG emissions will be recorded and reported in alignment with the *National Greenhouse and Energy Reporting Act* 2007 (NGER Act) and National Pollution Inventory as detailed in Section 8.3.8.

Acceptability outcome	Acceptable

7.4 Underwater Sound

7.4.1 Source of Aspect

Underwater sound will be generated by:

- Drill rig and vessel operations
- Transponders for anchor and rig positioning
- Helicopter operations
- Wellhead cutting

7.4.2 Extent and Duration of Aspect

Vessel and Drill Rig Operations - Drilling	
Extent	1.17 - 2.21 km Based on the furthest distance to a sound exposure criteria for drilling.
Duration	560 days Continuous underwater sound will be generated by the vessels and rig propellor cavitation, thrusters, hydrodynamic flow around the hull, and operation of machinery and equipment.
Vessel and Drill Rig Operations - Resupply	
Extent	6.23 – 19.6 km Based on the furthest distance to a sound exposure criteria for resupply.
Duration	3 hours per day Based on a review of operational details from Beach Energy's Otway Drilling Campaign, conducted from February 2021 to July 2022, resupply operations are predicted to occur near-daily for an average duration of 3 hours.
Helicopter Operations	
Extent	18 m Richardson et al. (1995) reported helicopter sound (for Bell 214 type) being audible in air for four minutes before it passed over receivers, but only detectable underwater for 38 seconds at 3 m depth and for 11 seconds at 18 m depth for the same flight path.
Duration	11 seconds on take-off and landing at the drill rig up to 7 times per week.
Wellhead Cutting	
Extent	Not distinguishable from the drilling underwater sound emissions
Duration	~1- 2 hours though may take up to 6 hours for more complex wells

7.4.3 Predicted Environmental Impacts

Potential impacts of underwater sound emissions to marine fauna from the Drilling Program are:

- Behavioural changes.
- Auditory impairment, permanent threshold shift (PTS) and temporary threshold shift (TTS).

7.4.4 EMBA

The sound EMBA is the area where sound levels are predicted to be above sound exposure criteria which are detailed in the relevant receptors impact assessment sections. Acoustic modelling undertaken to determine the sound EMBA is described in Section 7.4.8.1.

Continuous underwater sound emissions may impact ecological receptors within the sound EMBA such as:

- Fish (with and without swim bladders) including commercial species such as sharks and scalefish.
- Marine reptiles.
- Marine mammals.

As different sound exposure criteria apply to these receptors, sound EMBAs for each receptor is defined in the receptor consequence sections to identify potential receptors that may be affected.

Fish and marine mammals are values of the following within the sound EMBA:

- Conservation values and sensitivities
- Socio economic receptors
- Cultural values and sensitivities

7.4.5 Predicted Level of Impact: Helicopter

Helicopters are used to transport personnel to and from the drill rig. The presence of the helicopter and its associated sound field will be highly transient. On approach to the drill rig the helicopter will descend to the helideck where there is greatest potential to ensonify the water column. Sound pressure will be greatest at the sea surface and rapidly diminish with increasing depth. Helicopter engine sound is emitted at a range of frequencies generally, below 500 Hz (Richardson et al. 1995). Richardson et al. (1995) reported helicopter sound (for Bell 214 type) being audible in air for four minutes before it passed over receivers, but only detectable underwater for 38 seconds at 3 m depth and for 11 seconds at 18 m depth for the same flight path. Thus, the predicted extent of impact is between 3 to 18 m for a period of 11 – 38 seconds twice a day (landing and take-off). Based on such short-term, intermittent sounds the consequence to whales (including pygmy blue whales within the foraging BIA, southern right whales within the migration BIA and fin or sei whales which may also be foraging) and other marine fauna is assessed as Minor (1).

7.4.6 Predicted Level of Impact: Wellhead Cutting

Wellhead cutting will be required for the P&A of the legacy suspend wells and would typically take ~1-2 hours though may take up to 6 hours for more complex wells. Pangerc et al. (2016) described the underwater sound measurement data during an underwater diamond wire cutting of a 32" conductor (10 m above seabed in ~80 m depth) and found that at lower frequencies, the operation was generally indistinguishable above the background noise of the vessel. This is confirmed via acoustic modelling undertaken by JASCO (Koessler and McPherson 2021 Appendix G. 4) who modelled a stationary vessel at Thylacine North-1 on DP (operating at 20% MCR) plus a stationary vessel on DP (operating at 20% MCR) using a ROV cutting tool at Geographe-4. This showed an increase of ~30 m for the behaviour exposure criteria compared to an installation vessel on DP and ~6 m for the TTS 24 h exposure criteria.

As the wellhead cutting will not be distinguishable from the drilling underwater sound emissions it is inherently part of the assessment of drilling sound emissions.

7.4.7 Predicted Level of Impact: Transponders

An array of long baseline and/or ultra-short baseline transponders may be installed on the seabed for metrology and rig positioning. An array of transponders is proposed within a radius of 500 m from the proposed well location.

Transponder transmissions are not continuous but consist of short 'chirps' with a duration that ranges from 3 to 40 milliseconds. Transponders will not emit any sound when on standby and may emit acoustic signals for about six hours per well if used. When required for general positioning, they will emit one chirp every five seconds (estimated to be required for four hours at a time). When required for precise positioning, they will emit one chirp every second (estimated to be required for two hours at a time).

Transponders typically emit pulses of medium frequency sound, generally within the range 21 to 31 kHz. The estimated SPL would be 180 to 206 dB re 1 µPa at 1 m (Jiménez-Arranz et al. 2017). Based on empirical spreading loss estimates measured by Warner and McCrodan (2011), received levels from transponders may reach the cetacean behavioural response criteria for impulsive sources (160 dB re 1 µPa) out to ~42 m. As detailed in Table 7-5 this is significantly less than the distances to the behavioural response criteria for the vessel and drilling.

As the transponders will not be distinguishable from vessel and drilling underwater sound emissions it is inherently part of the assessment of drilling sound emissions.

7.4.8 Predicted Level of Impact: Drill Rig and Vessels

Vessels generate continuous sound from propellor cavitation, thrusters, hydrodynamic flow around the hull, and operation of machinery and equipment. Sound from support vessels operating during drilling activities has been assessed to determine the cumulative impact of multiple continuous sound sources in close proximity.

The drill rig will generate sound from onboard equipment vibrations (e.g. pumps, generators, and machinery), and a smaller portion transmitted directly via the drill bit during drilling.

The drill rig may operate in a thruster assist mode to move into the well location and in emergency situations as per the Rig Safety Case. This system generates variable non-impulsive sound during infrequent operation of one up to six thrusters in response to feedback from the mooring system. A review of 33 months of historical operational data from the North Sea indicates thrusters are typically not active (>96% of the time) and utilisation is otherwise limited low loads across a small number of thrusters for short periods, (typically hours) in response to metocean conditions.

7.4.8.1 Underwater Sound Modelling

JASCO Applied Sciences (JASCO) have performed four underwater acoustic modelling studies that are used to information this impact assessment. Table 7-4 details the Drilling Program locations and activities applicable to each of the studies and scenarios modelled.

As part of Beach's Drilling Campaign in 2021/2022, in the Otway Basin, JASCO undertook underwater sound monitoring to determine the source levels of the Ocean Onyx semi-submersible drill rig and support vessels, and further validate their propagation models (McPherson et al. 2021). The data from this monitoring program is used to inform the JASCO underwater acoustic modelling studies used for this impact assessment.

The modelling study assessed distances from the Drilling Program activities where underwater sound levels reached exposure criteria corresponding to various levels of potential impact to marine fauna. The marine fauna considered was based on a review of receptors that may be affected by continuous sound, these were marine mammals, turtles, and fish. The exposure criteria selected for the modelling and the impact assessment were selected as they have been accepted by regulatory agencies and they represent current best available science (Koessler et al. 2020, Matthews et al. 2020).

Modelling was not undertaken for anchor prelay or for drill rig mooring. As anchor prelay and drill rig mooring will involve the use of the support vessels on DP the modelling for resupply would be an approximate proxy.

Table 7-4: Drilling Program Locations and Activities and Relevant Sound Modelling Studies and Scenarios

Location	Drilling Program Activity	Relevant Modelling Report	Relevant Modelling Scenario	Justification
Bass Operational Areas	Drilling, Completions, P&A including Wellhead Cutting	Trefoil Drilling Underwater Sound Modelling Addendum (Stroot et al. 2022) Appendix G. 1	Scenario 1 MODU Drilling	As detailed in Figure 3-2 the proposed wells and P&A activities in the Bass Operational Areas are within a similar water depths and based on the seabed surveys undertaken have similar seabed characterisations (Section 6.4.1.1), thus underwater sound emissions would travel in a similar manner within these locations.
	Drill Rig Resupply		Scenario 2 MODU Drilling with OSV under DP (4 hour)	
Wells in VIC/P43 and VIC/P73	Drilling, P&A including Wellhead Cutting	Beach Otway Development Acoustic Monitoring: Characterisation, Validation, and Marine Mammals (McPherson et al. 2021) Appendix G. 4	Scenario 5 MODU Drilling Scenario 8 MODU Drilling + OSV Standby Transit)	As detailed in Figure 3-1 the proposed wells in Vic/P43 and VIC/P73 and the Geographe 1 well are within a similar water depths and based on the seabed surveys undertaken have similar seabed characterisations (Section 6.4.1.2), thus underwater sound emissions would travel in a similar manner within these locations.
Geographe 1	P&A including Wellhead Cutting			
Wells in VIC/P43 and VIC/P73 Geographe 1	Drill Rig Resupply		Scenario 7 MODU Drilling with OSV under DP (4 hour)	
Thylacine 1	P&A including Wellhead Cutting	Beach Otway Project: Additional and Revised Modelling Study (Koessler and McPherson 2021) Appendix G. 2	Scenario A1 MODU Drilling Scenario A7 MODU Drilling + OSV Standby Transit	The underwater sound modelling was undertaken at the Thylacine North 1 well which is in 100 m water depth and the Thylacine 1 well is in 100 m water depth. The wells are ~5 km apart and based on the seabed surveys undertaken have similar seabed characterisations (Section 6.4.1.2), thus underwater sound emissions would travel in a similar manner within these locations.
	Drill Rig Resupply		Scenario 5 MODU Drilling + 4h OSV Resupply	
Wells in T/30P	Drilling, P&A including Wellhead Cutting	Beach Otway Project, Additional Modelling at Well Location South (Connell and Koessler 2023) Appendix G. 3	Scenario 1 MODU Drilling Scenario 4 MODU Drilling + OSV Standby Transit	As detailed in Figure 3-1 proposed wells within the T/30P Operational Areas are within similar water depths and on the shelf edge, thus underwater sound emissions would travel in a similar manner within these locations.
	Drill Rig Resupply		Scenario 3 MODU Drilling + OSV under DP (4hr) + OSV under Transit (20hr) (Resupply Ops)	

Table 7-5: Marine Mammal PTS, TTS and Behaviour Sound Exposure Criteria and Predicted Furthest Distances

Hearing group	SEL_{24h} threshold ($L_{E,24h}$; dB re 1 µPa²·s)	Bass Drilling	Bass Resupply	VIC/P43, VIC/P73, Geographe 1 Drilling	VIC/P43, VIC/P73, Geographe 1 Drilling & Support Vessel	VIC/P43, VIC/P73, Geographe 1 Resupply	Thylacine Drilling	Thylacine Drilling & Support Vessel	Thylacine Resupply	T/30P Drilling	T/30P Drilling & Support Vessel	T/30P Resupply
		R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)
PTS												
LF cetaceans	199	0.02	0.09	-	-	-	0.03	0.06	0.12	-	-	0.10
HF cetaceans	198	0.02	0.09	-	-	-	0.02	0.04	0.05	-	-	0.05
VHF cetaceans	173	0.09	0.15	0.19	0.19	0.2	0.23	0.26	0.26	0.13	0.13	0.17
Phocid seals	201	Not modelled	Not modelled	-	-	-	0.02	0.04	0.05	Not modelled	Not modelled	Not modelled
Otariid seals	219	-	-	-	-	-	-	-	0.03	-	-	0.03
TTS												
LF cetaceans	179	0.33	0.6	0.31	0.31	0.95	0.39	0.39	1.06	0.23	0.23	1.48
HF cetaceans	178	0.06	0.13	0.13	0.13	0.16	0.13	0.13	0.16	0.09	0.09	0.12
VHF cetaceans	153	1.3	1.4	1.07	1.06	1.09	1.12	1.12	1.16	1.43	1.44	1.53
Phocid seals	181	Not modelled	Not modelled	0.12	0.12	0.35	0.12	0.12	0.32	Not modelled	Not modelled	Not modelled
Otariid seals	199	0.02	0.09	-	-	-	0.02	0.02	0.07	-	-	0.05
Behaviour	**SPL threshold (Lp; dB re 1 µPa)**											
Marine mammals	120	2.12	6.23	1.17	2.09	7.02	1.24	1.32	7.89	1.46	2.21	19.6

Note: a dash indicates the level was not reached within the limits of the modelling resolution (20 m).

7.4.8.2 Marine Mammals

Exposure Criteria - PTS and TTS

The US National Marine Fisheries Service (NMFS 2018) reviewed available literature to determine exposure criterion for the onset of temporary hearing TTS and PTS for marine mammals based on their frequency hearing range. NMFS (2018) details that after sound exposure ceases or between successive sound exposures, the potential for recovery from hearing loss exists, with PTS resulting in incomplete recovery and TTS resulting in complete recovery.

Southall et al. (2019) reviewed the criteria which have remained the same, however, the mid-frequency cetaceans from NMFS (2018) are classified as high-frequency cetaceans in Southall et al. (2019), and high-frequency cetaceans from NMFS (2018) are classified as very-high-frequency cetaceans in Southall et al. (2019). For this impact assessment the cetacean classification from Southall et al. (2019) are used.

The NFMS (2018) exposure criteria are based on a cumulative SEL over a period of 24 h. Table 7-5 details the criteria and furthest modelled distances to them for each scenario.

The PTS and TTS 24 h criteria are only relevant to those receptors that are likely to be present in the area of ensonification for a period of 24 h. For this assessment the PTS and TTS 24 h criteria was applied to marine mammals that may be undertaking biologically important behaviours, such as calving, foraging, resting or migration (as defined by CoA 2015), that could result in them being within the ensonification area above the PTS and TTS criteria for a period of 24 h or greater.

Exposure Criteria - Behaviour

Numerous studies on marine mammal behavioural responses to sound exposure have not resulted in consensus in the scientific community regarding the appropriate metric for assessing behavioural reactions. The current interim NFMS (NOAA 2019) criterion of 120 dB re 1 µPa for non-impulsive sound sources such as vessels is used as the marine mammal behavioural criteria for this assessment as it represents a conservative criterion as Southall et al. (2007) reviewed extensive literature and studies in relation to marine mammal behavioural response to impulsive (seismic, pile driving) and non-impulsive (drilling, vessels) and found that most marine mammals exhibited varying responses between 140 and 180 dB re 1 µPa.

Southall et al. (2021) provides recommendations and discusses the nuances of assessing behavioural response, the authors do not recommend new numerical thresholds for onset of behavioural responses for marine mammals.

Table 7-5 details the furthest modelled distance to the NOAA (2019) exposure criteria for each scenario.

Phocid Seals

As detailed in Table 7-5 not all well locations modelled the sound exposure criteria for Phocid seals as they have not been known to occur in the Otway and Bass areas.

As detailed in Table 7-5 distances to the sound exposure criteria for Phocid seals are:

- PTS criteria is reached at 40 m for drilling and P&A, and 50 m for resupply.

- TTS criteria is reached at 120 m for drilling and P&A, and 350 m for resupply.
- Behaviour criteria is reached at between 1.17 km to 2.21 km for drilling and P&A, and between 6.23 km to 19.6 km depending on the location.

No Phocid seals were identified within the 20 km Sound EMBA based on the PMST Report (Appendix E. 4) thus impacts are not assessed further.

Otariid Seals

As detailed in Table 7-5 distances to the sound exposure criteria for Otariid seals are:

- PTS criteria is only reached at 30 m for resupply at Thylacine and T/30P.
- Furthest distance to the TTS criteria is 20 m during drilling and P&A and 90 m for resupply.
- Behaviour criteria is reached at between 1.17 km to 2.21 km for drilling and P&A, and between 6.23 km to 19.6 km depending on the location.

Based on the PMST Report the Australian sea-lion and New Zealand fur-seal may occur, and the Australian fur-seal is likely to occur within the 20 km Sound EMBA, but no biologically important behaviours or biologically important areas were identified within the Sound EMBA.

The consequence is assessed as Minor (1) and is of an acceptable level based on:

- There are no biologically important behaviours, biologically important areas, aggregation areas or haul-out areas identified within the sound EMBA.
- PTS and TTS are not predicted as the PTS and TTS 24 h criteria are relevant to those receptors that are likely to be present in the area of ensonification for a period of 24 h, and no biologically important behaviours or biologically important areas were identified within the Sound EMBA for Otariid seals. It is highly unlikely that Otariid seals would stay within the drill rig for the duration required to experience PTS and TTS from drilling (30 m for 24 hours) or resupply (90 m for 4 hours).
- Breeding colonies for Australian fur seal and New Zealand fur seal known to occur along the Victorian coastline, including Deen Maar, and the west side of King Island are outside the sound EMBA.
- The Recovery Plan for the Australian Sea Lion (*Neophoca cinerea*) (DSEWPaC 2013b) does not identify underwater sound as a threat to the recovery of the species.
- The Conservation Advice for the Australian Sea-lion *Neophoca cinerea* (TSSC 2020c) details that studies of pinnipeds in the Northern Hemisphere indicate that exposure to sharp, short sounds of moderate intensity for extended periods (e.g. from seismic surveys, construction, or operation activities) may cause avoidance behaviour and/or hearing threshold changes in pinnipeds. Continuous sound from drilling and P&A do no consists of sharp, short sounds of moderate intensity for extended periods.

Very High-frequency Cetaceans

As detailed in Table 7-5 distances to the sound exposure criteria for very high-frequency (VHF) cetaceans are:

- Furthest distance to the PTS criteria is 260 m for drilling, P&A and resupply.
- Furthest distance to the TTS criteria is 144 m during drilling and P&A and 90 m for resupply.
- Behaviour criteria is reached at between 1.17 km to 2.21 km for drilling and P&A, and between 6.23 km to 19.6 km depending on the location.

Based on the PMST Report very high-frequency cetaceans such as pygmy and dwarf sperm whales may occur within the 20 km Sound EMBA, but no biologically important behaviours or biologically important areas were identified within the Sound EMBA.

The consequence is assessed as Minor (1) and is of an acceptable level based on:

- There are no biologically important behaviours or biologically important areas for very high-frequency cetaceans within the sound EMBA.
- No threatened very high-frequency cetaceans where identified within the sound EMBA.
- PTS and TTS are not predicted as the PTS and TTS 24 h criteria are relevant to those receptors that are likely to be present in the area of ensonification for a period of 24 h, and no biologically important behaviours or biologically important areas were identified within the Sound EMBA for very high-frequency cetaceans. It is highly unlikely that very high-frequency cetaceans would stay within the drill rig for the duration required to experience PTS and TTS from drilling (260 m for 24 hours) or resupply (260 m for 4 hours).

High-frequency Cetaceans

As detailed in Table 7-5 distances to the sound exposure criteria for high-frequency (HF) cetaceans are:

- Furthest distance to the PTS criteria is 40 m for drilling and P&A, and 90 m for resupply.
- Furthest distance to the TTS criteria is 130 m during drilling and P&A and 160 m for resupply.
- Behaviour criteria is reached at between 1.17 km to 2.21 km for drilling and P&A, and between 6.23 km to 19.6 km depending on the location.

Based on the PMST Report high-frequency cetaceans such as dolphin species, beaked and toothed whales, may occur within the 20 km Sound EMBA, but no biologically important behaviours or biologically important areas were identified within the Sound EMBA.

The consequence is assessed as Minor (1) and is of an acceptable level based on:

- There are no biologically important behaviours or biologically important areas for high-frequency cetaceans within the sound EMBA.
- No threatened high-frequency cetaceans where identified within the sound EMBA.

- PTS and TTS are not predicted as the PTS and TTS 24 h criteria are relevant to those receptors that are likely to be present in the area of ensonification for a period of 24 h, and no biologically important behaviours or biologically important areas were identified within the Sound EMBA for high-frequency cetaceans. It is highly unlikely that high-frequency cetaceans would stay within the drill rig for the duration required to experience PTS and TTS from drilling (130 m for 24 hours) or resupply (160 m for 4 hours).

Low-frequency Cetaceans

As detailed in Table 7-5 distances to the sound exposure criteria for low-frequency (LF) cetaceans are:

- Furthest distance to the PTS criteria is 30 m for drilling and P&A, and 120 m for resupply.
- Furthest distance to the TTS criteria is 390 m during drilling and P&A and 1.48 km for resupply.
- Behaviour criteria is reached at between 1.17 km to 2.21 km for drilling and P&A, and between 6.23 km to 19.6 km depending on the location.

Table 7-6 details the low-frequency cetaceans that have biologically important areas and/or biologically important behaviours within the sound EMBA.

Table 7-6: Low-frequency Cetaceans with Biologically Important Behaviours within the Sound EMBA

Species	Biologically Important Behaviour
Blue whale	Foraging, feeding or related behaviour known to occur within area.
	Otway - foraging (annual high use area) and known foraging area. Bass – foraging BIA
Fin whale	Foraging, feeding or related behaviour likely to occur within area.
	No BIAs
Pygmy right whale	Foraging, feeding or related behaviour may to occur within area.
	No BIAs
Sei whale	Foraging, feeding or related behaviour likely to occur within area.
	No BIAs
Southern right whale	Species or species habitat known to occur within area
	Migration BIA

Blue Whales

The Operational Areas and sound EMBA overlap the pygmy blue whale foraging (annual high use area) and known foraging area (Otway) and foraging BIA (Bass) (Figure 7-8).

Foraging behaviour for blue whales has been identified in the area where the PTS, TTS and behavioural sound exposure criteria is reached. As detailed in Section 6.4.7.6, blue whale foraging within the Otway and Bass, and hence the area where the PTS, TTS and behavioural criteria is reached, is typically from January to April (Gill et al. 2011) though whales may be present from November to June (McCauley et al. 2018) which overlaps the period when the Drilling Program will occur.

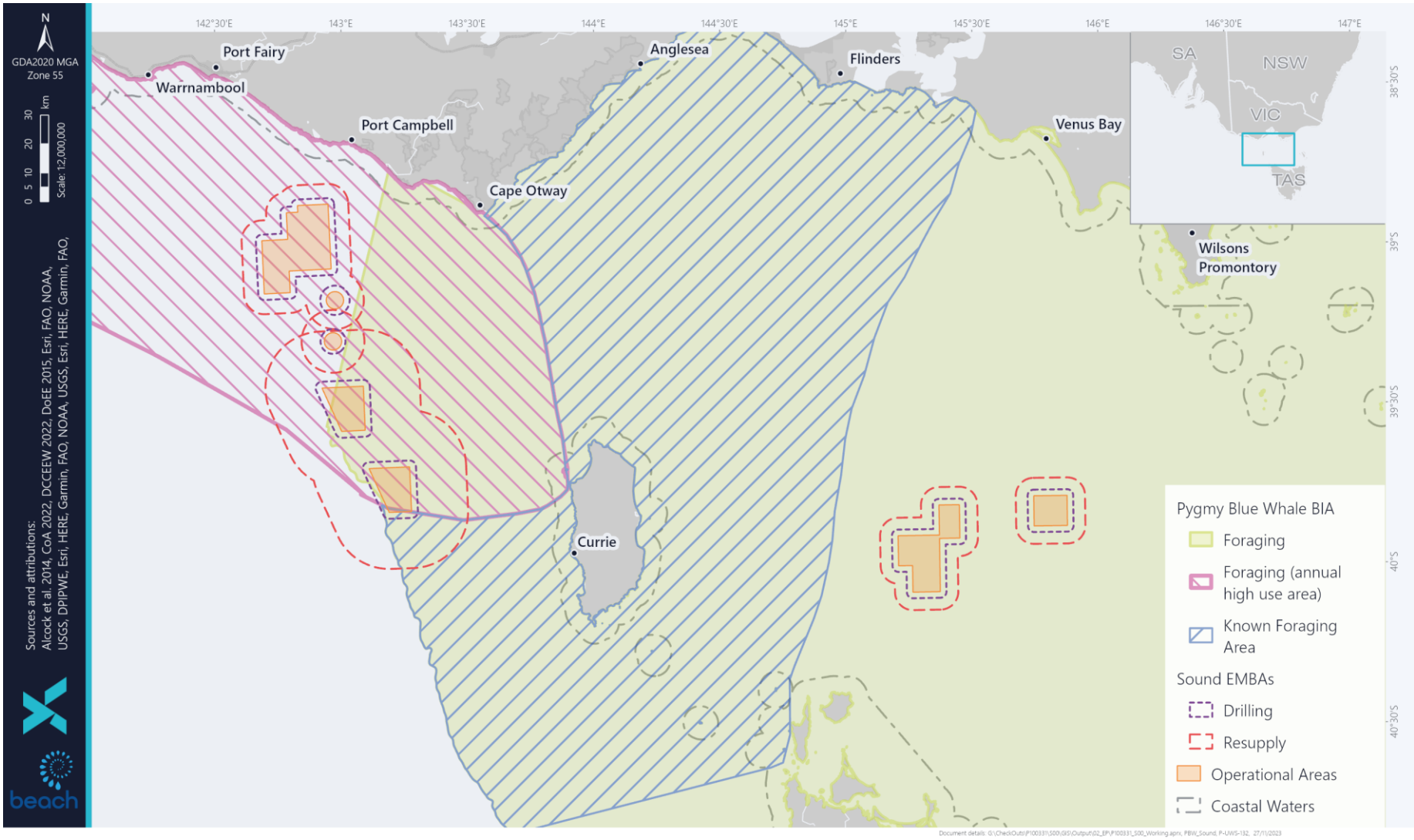


Figure 7-8: Drilling Program Operational Areas, Sound EMBAs and Pygmy Blue Whale Foraging BIAs

NOPSEMA on their website page Blue Whale Conservation Management Plan – FAQs detail the following:

> *If an offshore project or activity creates noise above relevant published injury and/or behavioural disturbance impact criteria inside a Foraging Area, proponents and titleholders should firstly evaluate all feasible measures to avoid times of the year when blue whales are likely to be foraging.*
>
> *If it is not possible to avoid times of year when there is credible information indicating that blue whale foraging in a Foraging Area is likely, it is important to note that there are requirements of the EPBC Act and the NOPSEMA EPBC Act-endorsed Program that constrain decision makers to 'not act inconsistently' with EPBC Act instruments, such as a recovery plan (e.g. the CMP).*
>
> *Accordingly, in order to demonstrate, with a high level of confidence, that requirements of the CMP will be met, approvals documentation needs to include content such as:*
>
> - *well-founded Environmental Impact Assessment;*
> - *commitment(s) to implement whale detection that will be effective in detecting whales over the extent and duration of predicted impacts, including provision for detection measures to be scalable based on triggers such as activity timing and location, and whale sighting data; and*
> - *associated management measures that are likely to be effective at preventing unacceptable impacts over the extent and duration scales informed by impact predictions and whale detection data gathered during the activity.*
>
> *In all cases, titleholders should refer to the guidance on key terms within the CMP that is available on the DCCEEW website, to inform their EIA and selection of control measures.*

Beach has determined that the risk to all threatened cetaceans that may be undertaking biologically important behaviour during the period of the Drilling Program cannot be avoided due to variability in timing of environmentally sensitive periods and unpredictable presence of some species, with blue whales potentially present in foraging areas between November to June (McCauley et al. 2018), and southern right whale typically present in the migration BIA from April to October (NCVA 2023h). Therefore, there is no period where avoidance of both species is possible.

In addition, Beach is required to meet its requirements under the OPGGS Act and petroleum licence conditions to explore and development gas reserves within their petroleum titles. Titleholders must also P&A suspended wells to comply with the requirements under section 572 of the OPGGS Act to remove all structures, equipment and other property that is neither used nor to be used in connection with operations authorised by the title. To progress these petroleum activities, Beach is planning a rig campaign commencing no earlier than November 2024 (subject to rig availability). This rig campaign will be shared across Beach's Bass and Otway assets, along with other titleholders who also have drilling activities planned in the region. A rig has been secured by Beach along with three other consortium members operating in the Otway Basin. The driver behind the consortium approach is to realise efficiencies through the execution of multiple wells in one campaign, reducing mobilisation and demobilisation activities and shared use of aviation and shore base support. Being part of a consortium also provides the flexibility to negotiate rig slot sequencing with other operators therefore optimising rig utilisation and minimising down-time.

As the Drilling Program could take up to 560 days there will be some overlap with periods when blue whales will be foraging in the Otway and Bass.

Thus, in order to demonstrate, with a high level of confidence, that requirements of the Conservation Management Plan for the Blue Whale (CoA 2015) will be met, Beach has undertaken a well-founded assessment of impacts to foraging blue whale from the Drilling Program and made commitments to implement a Whale Management Procedure (CM08) that includes whale observation and measures that have proven to be effective at preventing unacceptable impacts to foraging blue whales as per Beach's previous Otway Drilling Campaign.

The Conservation Management Plan for the Blue Whale (CoA 2015) details that anthropogenic noise in BIAs will be managed such that any blue whale continues to utilise the area without injury, and is not displaced from a foraging area.

DAWE (2021a) defines 'displaced as a foraging area' as:

> *The recovery plan requirement, Action A.2.3, applies in relation to BIAs. A whale could be displaced from a Foraging Area if impact mitigation is not implemented. This means that underwater anthropogenic noise should not:*
>
> - *Stop or prevent any blue whale from foraging.*
> - *Cause any blue whale to move on when foraging.*
> - *Stop or prevent any blue whale from entering a Foraging Area.*
>
> *It is considered that a whale is displaced from a Foraging Area if foraging behaviour is disrupted, regardless of whether the whale can continue to forage elsewhere within that Foraging Area. Mitigation measures must be implemented to reduce the risk of displacement occurring during operations where modelling indicates that behavioural disturbance within a Foraging Area may occur.*

DAWE (2021a) defines 'injury to blue whales' as:

> *For the purpose of interpreting and applying Action Area A.2 of the Blue Whale CMP, injury is both permanent and temporary hearing impairment (Permanent Threshold Shift and Temporary Threshold Shift) and any other form of physical harm arising from anthropogenic sources of underwater noise.*

As detailed in Table 7-5 the extent and duration of impact differs based on the activity being undertaken, however, the severity is assessed as moderate and is of an acceptable level based on:

- A conservative approach has been taken in applying the sound modelling and results such as the furthest distance to the PTS, TTS behavioural response sound exposure criteria for the scenarios modelled to assess potential impacts.
- The Conservation Management Plan for the Blue Whale (CoA 2015) details that shipping and industrial noise are classed as a minor consequence for which the definition is: individuals are affected but no affect at a population level.
- The Conservation Management Plan for the Blue Whale (CoA 2015) details that "It is the high intensity signals with high peak pressures received at very short range that can cause acute impacts such as injury and death." As drilling, P&A and vessel generate continuous sound and do

not have high intensity signals it is unlikely that they would cause injury or death to foraging pygmy blue whales.

- As the furthest distance to the 24 hr PTS sound exposure criteria is 120 m PTS impacts to blue whales are not predicted, as it would be highly unlikely for a pygmy blue whale to remain within 120 m of the drill rig for 24 hours even if it was foraging in the area.
- As the furthest distance to the 24 hr TTS sound exposure criteria for drilling is 390 m TTS impacts to blue whales whilst drilling or P&A are not predicted as it would be highly unlikely for a pygmy blue whale to remain within 390 m of the drill rig for 24 hours even if it was foraging.
- As the distances to the 24 hr TTS sound exposure criteria for resupply ranges from 600 m to 1.48 km depending on the well location, it is feasible that a foraging pygmy blue whale may remain within these distances of the drill rig while resupply occurs thus, Beach will implement a Whale Management Procedure (CM08) that includes whale observation and measures that have proven to be effective at preventing unacceptable TTS impacts to foraging blue whales as per Beach's previous Otway Drilling Campaign.
- Distances to the behavioural response sound exposure criteria for drilling range from 1.17 km to 2.21 km and for resupply from 6.23 km to 19.6 km depending on the location. Within these distances the behavioural response may range from biologically unimportant reactions to cessation of feeding to moving away from the sound source.
- The largest area of potential impact within the pygmy blue whale high density foraging BIA (35,627 km^2) is very small, at any one time being:
    - ~0.04% for the drilling and P&A
    - Between ~0.5% to ~3.4% for resupply for up to 3 hours.
- Beach will implement a Whale Management Procedure (CM08) that includes whale observation and measures that have proven to be effective at preventing unacceptable impacts to foraging blue whales as per Beach's previous Otway Drilling Campaign.

Southern Right Whales

The Operational Areas and sound EMBA do not overlap the southern right whale reproduction BIA but do overlap the southern right whale migration BIA (Figure 7-9). As detailed in Section 6.4.7.6, southern right whales are typically within the migration BIA from April to October (NCVA 2023h) which overlaps the period when the Drilling Program will occur.

Beach has determined that the risk to all threatened cetaceans that may be undertaking biologically important behaviour during the period of the Drilling Program cannot be avoided due to variability in timing of environmentally sensitive periods and unpredictable presence of some species, with blue whales potentially present in foraging areas between November to June (McCauley et al. 2018), and southern right whale typically present in the migration BIA from April to October (NCVA 2023h). Therefore, there is no period where avoidance of both species is possible.

In addition, Beach is required to meet its requirements under the OPGGS Act and petroleum licence conditions to explore and development gas reserves within their petroleum titles. Titleholders must

also P&A suspended wells to comply with the requirements under section 572 of the OPGGS Act to remove all structures, equipment and other property that is neither used nor to be used in connection with operations authorised by the title. To progress these petroleum activities, Beach is planning a rig campaign commencing no earlier than November 2024 (subject to rig availability). This rig campaign will be shared across Beach's Bass and Otway assets, along with other titleholders who also have drilling activities planned in the region. A rig has been secured by Beach along with three other consortium members operating in the Otway Basin. The driver behind the consortium approach is to realise efficiencies through the execution of multiple wells in one campaign, reducing mobilisation and demobilisation activities and shared use of aviation and shore base support. Being part of a consortium also provides the flexibility to negotiate rig slot sequencing with other operators therefore optimising rig utilisation and minimising down-time. As the Drilling Program could take up to 560 days there will be some overlap with periods when southern right whales are migrating in the Otway and Bass.

Thus, in order to demonstrate, with a high level of confidence, that requirements of the Conservation Management Plan for the Southern Right Whale (DSEWPaC 2012a) and draft National Recovery Plan for the Southern Right Whale (DCCEEW 2022a) will be met, Beach has undertaken an assessment of impacts to migrating southern right whales from the Drilling Program and made commitments to implement a Whale Management Procedure (CM08) that includes whale observation and measures that have proven to be effective at preventing unacceptable impacts to southern right whales as per Beach's previous Otway Drilling Campaign.

The Conservation Management Plan for the Southern Right Whale identifies shipping and industrial noise as a threat but does not detail any actions of requirements for managing noise. The draft National Recovery Plan for the Southern Right Whale details that actions within and adjacent to southern right whale BIAs and habitat critical to the survival of the species, should demonstrate that it does not prevent any southern right whale from utilising the area or cause injury (TTS and PTS) and/or disturbance.

As detailed in Table 7-5 the extent and duration of impact differs based on the activity being undertaken, however, the severity is assessed as moderate and is of an acceptable level based on:

- A conservative approach has been taken in applying the sound modelling and results such as the furthest distance to the PTS, TTS behavioural response sound exposure criteria for the scenarios modelled to assess potential impacts.
- The sound EMBA does not overlap the southern right whale reproduction BIA and thus no impact to the reproduction BIA are predicted.
- The Conservation Management Plan for the Southern Right Whale identifies shipping and industrial noise as a threat that is classed as a minor consequence which is defined as individuals are affected but no affect at a population level.
- Marine mammal observer data from January 2021 to April 2022 for the drilling program in the Otway Development Area identified three southern right whales consisting of a single individual in each month of June, July and August.
- PTS and TTS impacts to migrating southern right whales are not predicted as they are a mobile species migrating through the area to reach coastal habitat or return to southern foraging

grounds and studies report swim speeds for the southern right whale of between 3 – 3.3 km / hr (Mate et al. 2011, Mackay et al. 2015 cited in Charlton 2017).

  - As the furthest distance to the 24 hr PTS sound exposure criteria is 120 m PTS impacts to migrating southern right whales are not predicted, as it would be highly unlikely for a migrating southern right whale to remain within 120 m of the drill rig for 24 hours based on their swimming speeds.

  - As the furthest distance to the 24 hr TTS sound exposure criteria for drilling is 390 m TTS impacts to migrating southern right whales whilst drilling or P&A are not predicted as it would be highly unlikely for a migrating southern right whale to remain within 390 m of the drill rig for 24 hours based on their swimming speeds.

  - As the distances to the 24 hr TTS sound exposure criteria for resupply ranges from 600 m to 1.48 km depending on the well location, TTS impacts to migrating southern right whales are not predicted as resupply is on average for 3 hours and southern right whales would only be within the 24 hr TTS sound exposure criteria for less than an hour based on their swimming speeds.

- Distances to the behavioural response sound exposure criteria for drilling range from 1.17 km to 2.21 km and for resupply from 6.23 km to 19.6 km depending on the location. Within these distances the behavioural response may range from biologically unimportant reactions to moving away from the sound source.

- Avoidance behaviour may be exhibited if southern right whales are migrating through the area where the behavioural sound exposure criteria is reached. Disturbance of migrating mothers could increase their energy expenditure which could result in a reduction of energy available for their calf and for their return migration (Christiansen et al. 2014b). Based on an average swim speed of between 3 – 3.3 km / hr (Mate et al. 2011, Mackay et al. 2015 cited in Charlton 2017) energetic costs would be extremely low if avoidance behaviour occurred for drilling and P&A (1.17 km to 2.21 km) and low for resupply (6.23 km to 19.6 km) that on average occurs for 3 hours.

- Southern right whales may avoid the area where the behavioural sound exposure criteria is reached but there is no impediment to them continuing to and from the coastal reproduction BIA. Southern right whales are a highly mobile migratory species that travel thousands of kilometres between habitats used for essential life functions (DSEWPaC 2012a). Along the Australian coast, individual southern right whales use widely separated coastal areas (200–1,500 km apart) within a season, indicating substantial coast-wide movement. The longest movements are undertaken by non-calving whales, though calving whales have also been recorded at locations up to 700 km apart within a single season (DSEWPaC 2012a). As such, avoidance of the sound EMBA is unlikely to prevent them from undertaking their seasonal migrations.

- Beach will implement a Whale Management Procedure (CM08) that includes whale obervation and measures that have proven to be effective at preventing unacceptable impacts to migrating southern right whales as per Beach's previous Otway Drilling Campaign.

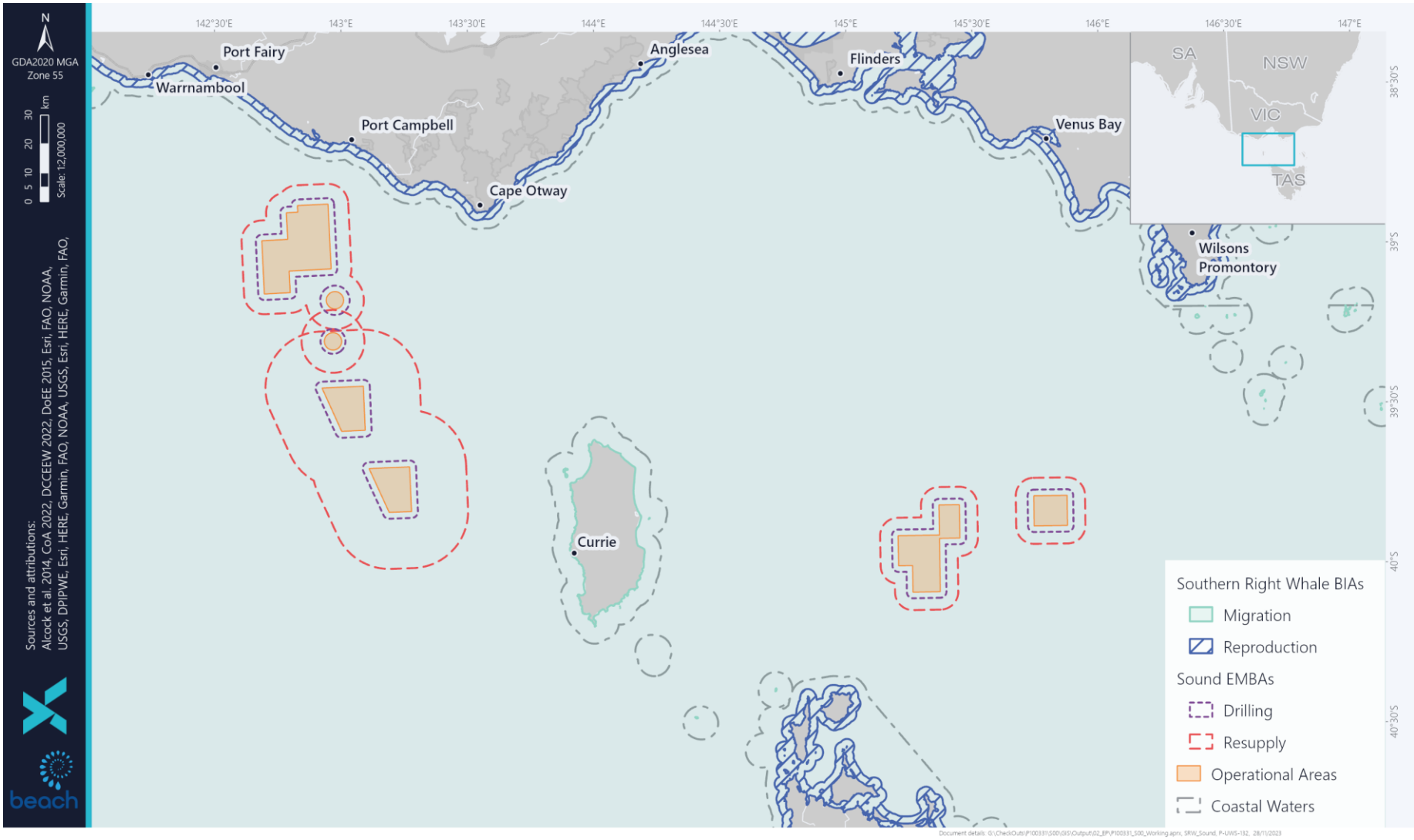


Figure 7-9: Drilling Program Operational Areas, Sound EMBAs and Southern Right Whale BIAs

Other Whales

Foraging behaviour for fin, pygmy right and sei whales has been identified within the sound EMBA. As detailed in Section 6.4.7.6 cetacean foraging within the Otway and Bass is typically from January to April (Gill et al. 2011) though whales may be present from November to June (McCauley et al. 2018) which overlaps the period when the Drilling Program will occur.

Beach has determined that the risk to all threatened cetaceans that may be undertaking biologically important behaviour during the period of the Drilling Program cannot be avoided due to variability in timing of environmentally sensitive periods and unpredictable presence of some species, with fin, pygmy right and sei whales potentially present in foraging areas between November to June (McCauley et al. 2018) and southern right whale typically present in the migration BIA from April to October (NCVA 2023h). Therefore, there is no period where avoidance of both species is possible.

In addition, Beach is required to meet its requirements under the OPGGS Act and petroleum licence conditions to explore and development gas reserves within their petroleum titles. Titleholders must also P&A suspended wells to comply with the requirements under section 572 of the OPGGS Act to remove all structures, equipment and other property that is neither used nor to be used in connection with operations authorised by the title. To progress these petroleum activities, Beach is planning a rig campaign commencing no earlier than November 2024 (subject to rig availability). This rig campaign will be shared across Beach's Bass and Otway assets, along with other titleholders who also have drilling activities planned in the region. A rig has been secured by Beach along with three other consortium members operating in the Otway Basin. The driver behind the consortium approach is to realise efficiencies through the execution of multiple wells in one campaign, reducing mobilisation and demobilisation activities and shared use of aviation and shore base support. Being part of a consortium also provides the flexibility to negotiate rig slot sequencing with other operators therefore optimising rig utilisation and minimising down-time. As the Drilling Program could take up to 560 days there will be some overlap with periods when fin, pygmy right and sei whales will be foraging in the Otway and Bass.

The fin, pygmy right and sei whales do not have conservation management plans. The fin and sei whales have conservation advice (TSSC 2015f, TSSC, 2016g) which both identify anthropogenic noise as a threat with the conservation and management actions of:

- Once the spatial and temporal distribution (including biologically important areas) of sei whales is further defined an assessment of the impacts of increasing anthropogenic noise (including from seismic surveys, port expansion, and coastal development) should be undertaken on this species.
- If required, additional management measures should be developed and implemented to ensure the ongoing recovery of fin and sei whales.

As detailed in Table 7-5 the extent and duration of impact differs based on the activity being undertaken, however, the severity is assessed as moderate and is of an acceptable level based on:

- A conservative approach has been taken in applying the sound modelling and results such as the furthest distance to the PTS, TTS behavioural response sound exposure criteria for the scenarios modelled to assess potential impacts.

- The fin and sei whale's conservation advice (TSSC 2015f, TSSC 2016g) has a consequence rating for anthropogenic noise and acoustic disturbance as minor with the extent over which the threat may operate as moderate-large.

- There is no conservation advice for the pygmy right whale, as it is not a threatened species, and the Species Profile and Threats Database (DoE 2023) does not identify anthropogenic noise and acoustic disturbance as a threat.

- As the furthest distance to the 24 hr PTS sound exposure criteria is 120 m PTS impacts to fin, pygmy right and sei whales are not predicted, as it would be highly unlikely for a fin, pygmy right or sei whale to remain within 120 m of the drill rig for 24 hours even if it was foraging in the area.

- As the furthest distance to the 24 hr TTS sound exposure criteria for drilling is 390 m TTS impacts to fin, pygmy right and sei whales whilst drilling or P&A are not predicted as it would be highly unlikely for a fin, pygmy right or sei whale to remain within 390 m of the drill rig for 24 hours even if it was foraging.

- As the distances to the 24 hr TTS sound exposure criteria for resupply ranges from 600 m to 1.48 km depending on the well location, it is feasible that a foraging fin, pygmy right or sei whale may remain within these distances of the drill rig while resupply occurs thus, Beach will implement a Whale Management Procedure (CM08) that includes whale observation and measures that have proven to be effective at preventing unacceptable impacts to foraging fin, pygmy right or sei whales as per Beach's previous Otway Drilling Campaign.

- Distances to the behavioural response sound exposure criteria for drilling range from 1.17 km to 2.21 km and for resupply from 6.23 km to 19.6 km depending on the location. Within these distances the behavioural response may range from biologically unimportant reactions to cessation of feeding to moving away from the sound source.

- Low numbers of fin, sei and pygmy right whales are predicted within the Sound EMBA based on:

    - The sound EMBA is ~75 km from the Bonney coast upwelling KEF which is known as feeding aggregation area (Gill et al. 2011, McCauley et al. 2018) where fin and sei whales have been alighted feeding (Gill et al. 2015, Morrice et al. 2004).

    - No biologically important areas were identified for these species.

    - Aerial surveys in the Otway region (2002 – 2013) recorded seven fin whale sightings consisting of 8 individuals, 12 sei whale sightings consisting of 14 individuals and one pygmy right whale sighting consisting of 100 individuals (Gill et al. 2015). Gill et al. (2015) did observer feeding behaviour for sei and fin whales but noted that it is at least an opportunistic feeding area for these species.

    - Infrequent presence of fin whales has been recorded in Portland between 2009 to 2016 (Erbe et al. 2016, Aulich et al. 2019).

7.4.8.3 Marine Turtles

The Recovery Plan for Marine Turtles in Australia (CoA 2017b) identifies noise interference as a threat to turtles. It details that exposure to chronic (continuous) loud noise in the marine environment may lead to avoidance of important habitat.

In 2006, the Working Group on the Effects of Sound on Fish and Turtles was formed to develop sound exposure criteria for fish and turtles. The Working Group developed guidelines with specific thresholds for different levels of effects for several species groups including turtles (Popper et al. 2014).

Popper et al. (2014) details that there is no direct evidence of mortality or potential mortal injury to sea turtles from ship sound emissions.

Popper et al. (2014) found that there was no data to available to propose a quantitative exposure guideline or criteria for marine turtles for continuous sound such as those generated by vessels and rigs and instead suggested general distances to assess potential impacts. Using semi-quantitative analysis, Popper et al. (2014) suggests that there is a low risk to marine turtles from shipping and continuous sound except for TTS near (10s of metres) to the sound source, and masking at near, intermediate (hundreds of metres) and far (thousands of metres) distances and behaviour at near and intermediate distances from the sound source.

Finneran et al. (2017) presented thresholds for turtle PTS and TTS for continuous sound. Table 7-7 details the criteria and modelled distances to them from the reports detailed Table 7-4. In summary:

- The furthest distance to the 24 hr PTS criteria was reached within 50 m.
- The furthest distance to the 24 hr TTS criteria was reached within 100 m.

From the PMST Report (Appendix E. 1) three marine turtle species are likely or may occur within the Operational Areas though no BIAs or habitat critical to the survival of the species were identified. No biologically important behaviours were identified.

The extent of the area of impact is predicted to be up to 100 m of a well location whilst the rig is on location. The consequence is assessed as Minor (1) and is of an acceptable level based on:

- The Recovery Plan for Marine Turtles in Australia (CoA 2017b) details that exposure to chronic (continuous) loud noise in the marine environment may lead to avoidance of important habitat and no marine turtle important habits are located within the area that maybe impacted by underwater noise.
- Thresholds for turtle PTS and TTS over 24 hours were predicted to occur with a maximum distance of 100 m from each well location where no marine turtle important habits are located.
- Avoidance behaviour may occur within the operational area where no marine turtle important habits are located.
- Low numbers of marine turtles are predicted in the Operational Area and therefore impacts would be limited to avoidance behaviour of small number of individuals.

- The Recovery Plan for Marine Turtles in Australia does not identify any actions relevant to underwater noise.

7.4.8.4 Fish

Popper et al. (2014) details that there is no direct evidence of mortality or potential mortal injury to fish from ship sound emissions. Popper et al. (2014) details that risks of mortality and potential mortal injury, and recoverable injury impacts to fish with no swim bladder (sharks) or where the swim bladder is not involved in hearing is low and that TTS in hearing may be a moderate risk near (tens of metres) the vessel. For fish with a swim bladder involved in hearing, risks of mortality and potential mortal injury impacts is low. However, some evidence suggests that fish sensitive to acoustic pressure show a recoverable loss in hearing sensitivity, or injury when exposed to high levels of sound and Popper et al. (2014) details sound exposure criteria for fish with a swim bladder involved in hearing. Table 7-8 details the criteria and modelled distances to them from the reports detailed Table 7-4. In summary:

- The 48 h recoverable injury sound exposure criteria was not reached for drilling and P&A activities.
- The 48 h recoverable injury sound exposure criteria was only reached for resupply activities at distances from 0.02 m to 0.07 m.
- The 12 hr TTS sound exposure criteria was only reached at Bass for drilling and P&A activities at a distance of 0.02 m.
- The 12 hr TTS sound exposure criteria was reached for resupply activities at distances from 0.09 m to 0.16 m.

From the PMST Report (Appendix E. 1) the Operational Areas are within a distribution BIA for the white shark though no habitat critical to the survival of the species or biologically important behaviours were identified.

The northern T/30P Operational Area overlaps the West Tasmania Canyons KEF (Figure 7-10) which have the potential for site-attached fish due to the presence of low-relief bryozoan thicket and diverse sponge communities (Williams et al. 2009).

The nearest marine protected area, Zeehan AMP, is 1 km from the T/30P Operational Area is identified as having rocky limestone banks that provide important seabed habitats for a variety of commercial fish species and concentrations of larval blue wahoo and ocean perch demonstrate the role of the area as a nursery ground (DNP 2013).

Low to medium levels of commercial fishing for fish species were identified within the Operational Areas with scalefish and shark fishing occurring nearshore in the Otway and within the Bass Operational Areas (Section 6.5.9).

Eels that have important cultural value to First Nations may also migrate through the Operational Areas (Section 6.4.7.3).

Impacts to King George whiting spawning and recruitment was raised by a stakeholder (Stakeholder ID 25165861) in relation to the Corner Inlet Fishery. Post-larvae of King George whiting appear in bays and inlets of Victoria from September to November each year (Jenkins et al. 2000) with the only

spawning aggregations identified to date in South Australia near Kangaroo island and south-east Spencer gulf (Jenkins et al. 2000, Hamer et al 2004).

The extent of the area of impact is predicted to be up to 160 m of a well location whilst the rig is on location. The consequence is assessed as Minor (1) and is of an acceptable level based on:

- The 48 h recoverable injury sound exposure criteria was not reached for drilling and P&A activities.
- The 48 h recoverable injury sound exposure criteria was only reached for resupply activities at distances from 0.02 m to 0.07 m. Impacts to fish are not predicted as:
    - Pelagic species such as sharks and scalefish which continually move are unlikely to remain within 20 - 70 m of the drill rig for 48 hours.
    - Site-attached fish are associated with seabed features and water depths of the Bass Operational Area range from 55 – 80 m, thus the 12 hr TTS sound exposure criteria (70 m) could be reach in some areas. To mitigate any impacts to site attached fish a seabed survey will be undertake prior to the commencement of the Drilling Program to allow for the consideration of seabed habitat type in the final selection of well locations to avoid area of high relief outcrops, reefs or sponge beds that are likely to be associated with site-attached fish.
- The 12 hr TTS sound exposure criteria was only reached at Bass for drilling and P&A activities at a distance of 0.02 m. Impacts to fish are not predicted as:
    - Pelagic species such as sharks and scalefish which continually move are unlikely to remain within 20 m of the drill rig for 12 hours.
    - Site-attached fish are associated with seabed features and water depths of the Bass Operational Area range from 55 – 80 m, thus the 12 hr TTS sound exposure criteria (20 m) is not reached at the seafloor.
- The 12 hr TTS sound exposure criteria was reached for resupply activities at distances from 0.09 m to 0.16 m. Impacts to fish are not predicted as:
    - Pelagic species such as sharks and scalefish which continually move are unlikely to remain within 90 - 160 m of the drill rig for 12 hours.
    - Seabed surveys within of the VIC/P43 and VIC/P73 titles and at Geographe and Thylacine did not identify site-attached fish and habitats associated with site attached fish (Section 6.4.1.2).
    - To mitigate any TTS impacts to site attached fish a seabed survey will be undertake prior to the commencement of the Drilling Program to allow for the consideration of seabed habitat type in the final selection of well locations to avoid area of high relief outcrops, reefs or sponge beds that are likely to be associated with site-attached fish.

- The Recovery Plan for the White Shark (*Carcharodon carcharias*) (DSEWPaC 2013a) does not identify sound impacts as a threat and no habitat critical to the survival of the species or biologically important behaviours were identified.

- Impacts to eels that may migrate through the Otway and Bass shelf to deeper waters are not predicted to be impacted as a study by Koster et al. 2021 tracked 16 shortfinned eels found that the average speed was 30.8 ± 7.3 km/day while eels were on the continental shelf and 29.7 ± 11.1 km/day while in deep water. Thus, migrating eels are unlikely to be impacted based on the small distances to the 48 h recoverable injury (furthest 70 m) and 12 h TTS (furthest 160 m) sound exposure criteria and the distance eels travel while migrating.

- Impacts to King George Whiting and their spawning and recruitment are not predicted based on the very small distances to the 48 h recoverable injury (furthest 70 m) and 12 h TTS (furthest 160 m) sound exposure criteria. Based on these distances sound exposure is not predicted at the bays and inlets of Victoria where post-larvae of King George whiting appear or at spawning aggregations identified in South Australia near Kangaroo island and south-east Spencer gulf (Jenkins et al. 2000, Hamer et al 2004).

- The 48 h recoverable injury and 12 hr TTS sound exposure criteria are not reached at the Zeehan AMP, so no impacts to fish associated with the Zeehan AMP are predicted.

- The northern T/30P Operational Area overlaps the West Tasmania Canyons KEF in water depths >150 m (Figure 7-10). Impacts to site attached fish associated with low-relief bryozoan thicket and diverse sponge communities are not predicted based on the:

  - 48 h recoverable injury sound exposure criteria at T/30P is reached at 20 m.

  - 12 h TTS (furthest 160 m) sound exposure criteria at T/30P is reached at 110 m.

- Impacts to sharks and scalefish that are commercially fished are not predicted based on the small distances to the 48 h recoverable injury (furthest 70 m) and 12 h TTS (furthest 160 m) sound exposure criteria, where these pelagic species are unlikely to be present for time periods where impacts could occur.

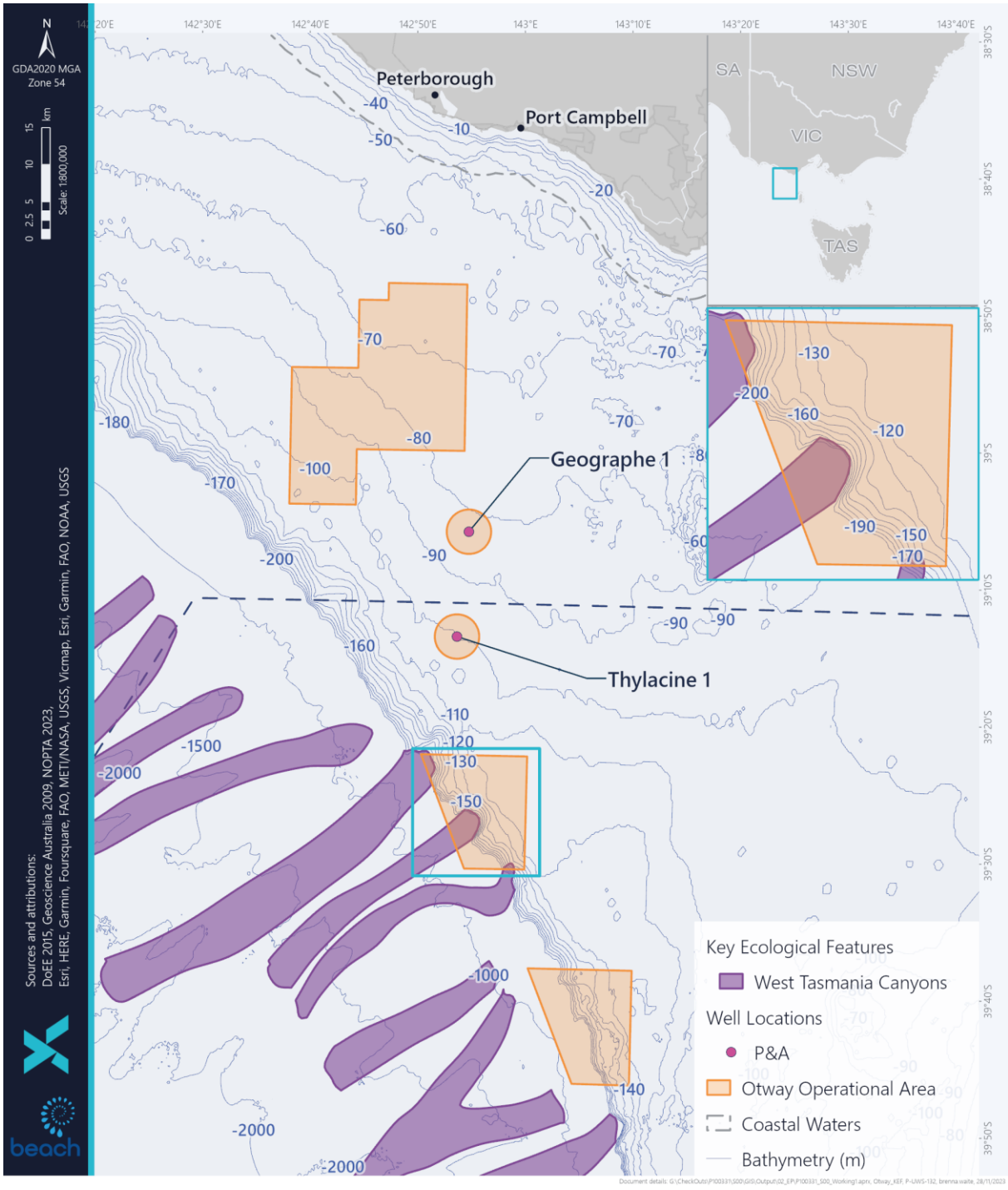


Figure 7-10: Otway Operational Areas and West Tasmania Canyons KEF

Table 7-7: Turtle Underwater Sound Thresholds and Modelled Distances

Marine Turtles	SEL_{24h} threshold	Bass Drilling	Bass Resupply	VIC/P43, VIC/P73, Geographe 1 Drilling	VIC/P43, VIC/P73, Geographe 1 Drilling & Support Vessel	VIC/P43, VIC/P73, Geographe 1 Resupply	Thylacine Drilling	Thylacine Drilling & Support Vessel	Thylacine Resupply	T/30P Drilling	T/30P Drilling & Support Vessel	T/30P Resupply
		R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)
PTS	220 dB re 1 $\mu Pa^2 \cdot s$	-	0.01	-	-	-	-	-	0.05	-	-	0.05
TTS	200 dB re 1 $\mu Pa^2 \cdot s$	0.02	0.09	-	-	-	0.02	0.02	0.10	-	-	0.08

Note: a dash indicates the level was not reached within the limits of the modelling resolution (20 m).

Table 7-8: Fish Underwater Sound Thresholds and Modelled Distances

Fish: Swim bladder involved in hearing	SPL (Lp; dB re 1 µPa)	Bass Drilling	Bass Resupply	VIC/P43, VIC/P73, Geographe 1 Drilling	VIC/P43, VIC/P73, Geographe 1 Drilling & Support Vessel	VIC/P43, VIC/P73, Geographe 1 Resupply	Thylacine Drilling	Thylacine Drilling & Support Vessel	Thylacine Resupply	T/30P Drilling	T/30P Drilling & Support Vessel	T/30P Resupply
		R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)
Recoverable injury	170 dB SPL for 48 h	-	0.07	-	-	0.06	-	-	0.05	-	-	0.02
TTS	158 dB SPL for 12 h	0.02	0.09	-	-	0.16	-	-	0.15	-	-	0.11

Note: a dash indicates the level was not reached within the limits of the modelling resolution (20 m).

7.4.8.5 Conservation Values and Sensitivities

The West Tasmania Canyon KEF and Zeehan AMP were identified as conservation values and sensitivities were sound exposure criteria were reached.

West Tasmania Canyon Key Ecological Features
The northern T/30P Operational Area overlaps the West Tasmania Canyons KEF in water depths >150 m (Figure 7-10).

West Tasmania Canyon, a key ecological feature identified for the South-east Marine Region, located on the edge of the continental shelf offshore of the north-west corner of Tasmania (DoE 2015b). As described in Section 6.2.15.6, these canyons are associated with upwellings and high productivity. Sponges are concentrated near the canyon heads, with the greatest diversity between 200 m and 350 m depth. This high productivity area is associated with abundance of fishes, including fish nurseries (blue warehou and ocean perch), foraging seabirds (albatross and petrels), white shark and foraging blue and humpback whales.

The severity of impact to the West Tasmania Canyon KEF from underwater sound is assessed as moderate, based on the potential presence of foraging blue whales, and is of an acceptable level based on:

- Continuous underwater sound has not been identified as an impact to sponges.
- The northern T/30P Operational Area overlaps the West Tasmania Canyons KEF in water depths >150 m (Figure 7-10). Impacts to site attached fish associated with low-relief bryozoan thicket and diverse sponge communities are not predicted based on the:
    - 48 h recoverable injury sound exposure criteria at T/30P is reached at 20 m.
    - 12 h TTS (furthest 160 m) sound exposure criteria at T/30P is reached at 110 m.
- Continuous underwater sound has not been identified as an impact to birds. As detailed in Section 7.4.8.4 predicted impacts to fish are localised and temporary and would not impact on foraging by seabirds such as albatross and petrels.
- As detailed in Section 7.4.8.2, there is the potential for foraging blue whales to be exposed to sound exposure criteria for 24 hr TTS and behavioural response. Thus, Beach will implement a Whale Management Procedure (CM08) that includes whale observation and measures that have proven to be effective at preventing unacceptable impacts to foraging blue whales as per Beach's previous Otway Drilling Campaign.
- Impacts to migrating humpback whales are not predicted as:
    - The furthest distance to the 24 hr PTS sound exposure criteria is 120 m and it would be highly unlikely for a migrating humpback whale to remain within 120 m of the drill rig for 24 hours.
    - The furthest distance to the 24 hr TTS sound exposure criteria for drilling is 390 m resupply ranges from 600 m to 1.48 km depending on the well location. It would be highly unlikely for a migrating humpback whale to remain within these distances of the drill rig for 24 hours based on an average migrating swim speed of 5 – 9 km/hr (Murray n.d).

- Distances to the behavioural response sound exposure criteria for drilling range from 1.17 km to 2.21 km and for resupply from 6.23 km to 19.6 km depending on the location. Within these distances the behavioural response may range from biologically unimportant reactions to moving away from the sound source which is unlikely to significant affect migrating humpback whales based on an average migrating swim speed of 5 – 9 km/hr (Murray n.d).

Zeehan Australian Marine Park
The Zeehan AMP is 1 km from the T/30P Operational Area. Based on the acoustic modelling the following sound exposure criteria could be reached at the Zeehan AMP:

- 24hr TTS sound exposure criteria for VHF cetaceans (1.44 km) for drilling at T/30P.
- 24hr TTS sound exposure criteria for LF cetaceans (1.48 km) for resupply at T/30P.
- 24hr TTS sound exposure criteria for VHF cetaceans (1.53 km) for resupply at T/30P.
- Behavioural response sound exposure criteria for marine mammals for drilling (2.21 km) and resupply (19.6 km) at T/30P.

Noise pollution associated with shipping, other vessels, seismic survey, offshore mining operations and offshore construction is listed as a pressure on the conservation values of the South-east Marine Reserve Network within the South-east Commonwealth Marine Reserves Network Management Plan (2013-2023) (DNP 2013). The Plan requires that potential impacts of allowable activities on the conservation values of the marine reserves network are identified and avoided or mitigated by appropriate assessment and authorisation processes, such as the OPGGS Act. In addition, the Marine Parks Science Atlas (AMP 2024), identifies underwater noise as a key pressure for the Zeehan AMP.

The Zeehan AMP major conservation values (DNP 2013) are:

- Examples of ecosystems, habitats and communities associated with the Tasmania Province, the West Tasmania Transition and the Western Bass Strait Shelf Transition and associated with the seafloor features: abyssal plain/deep ocean floor, canyon, deep/hole/valley, knoll/abyssal hill, shelf, and slope.
- Important migration area for blue and humpback whales.
- Important foraging habitat for black-browed, wandering, and shy albatrosses, and great-winged and cape petrels.

Key values, habitats, and communities (AMP 2024) are:

- Rocky limestone reefs of varying size which support large sponges, sea whips and large soft and hard bryozoans whilst Coarse sediments provide valuable foraging grounds for crustaceans such as giant crabs.

BIAs associated with the Zeehan AMP are:

- Foraging BIAs for albatross (Antipodean, black-browed, Buller's, Campbell, Indian yellow-nosed, shy and wandering), shearwater (short-tailed and wedge-tailed) and petrels (common diving and white-faced storm).

- Pygmy blue whale foraging BIA and southern right whale migration BIA.

The severity of impact to the Zeehan AMP from underwater sound is assessed as moderate, based on the potential presence of foraging blue whales and migrating southern right whales, and is of an acceptable level based on:

- No impacts from sound emissions to ecosystems, habitats and communities associated with the Tasmania Province, the West Tasmania Transition, and the Western Bass Strait Shelf Transition for underwater continuous sound. The furthest distance to a sound exposure criteria for fish is 160 m (Section 7.4.8.4) and as the Operational Area are >1 km from the AMP there will be no impact to fish associated with these ecosystems, habitats, or communities.

- Continuous underwater sound has been identified to potentially impact invertebrates, though no studies have been undertaken specifically on giant crabs (Solé et al. 2023). Impacts have typically been found in laboratory studies (Solé et al. 2023) or in field studies in shallow water (< 15 m) near to major shipping lanes (Day et a. 2020). In both these cases exposures is direct and in shallow water. As the Zeehan AMP is 1 km from the T/30P Operational Area and in water depths ranging from 70 to 6,000 m, impacts to giant crab are not predicted.

- Continuous underwater sound has not been identified as an impact to birds. As detailed in Section 7.4.8.4 predicted impacts to fish are localised and temporary and would not impact on foraging by albatross, petrels, or shearwaters.

- As detailed in Section 7.4.8.2, there is the potential for foraging blue whales and migrating southern right whales to be exposed to sound exposure criteria for 24 hr TTS and behavioural response. Thus, Beach will implement a Whale Management Procedure (CM08) that includes whale observation and measures that have proven to be effective at preventing unacceptable impacts to whales as per Beach's previous Otway Drilling Campaign.

- Impacts to migrating humpback whales are not predicted as:

    - The furthest distance to the 24 hr PTS sound exposure criteria is 120 m and it would be highly unlikely for a migrating humpback whale to remain within 120 m of the drill rig for 24 hours.

    - The furthest distance to the 24 hr TTS sound exposure criteria for drilling is 390 m resupply ranges from 600 m to 1.48 km depending on the well location. It would be highly unlikely for a migrating humpback whale to remain within these distances of the drill rig for 24 hours based on an average migrating swim speed of 5 – 9 km/hr (Murray n.d).

    - Distances to the behavioural response sound exposure criteria for drilling range from 1.17 km to 2.21 km and for resupply from 6.23 km to 19.6 km depending on the location. Within these distances the behavioural response may range from biologically unimportant reactions to moving away from the sound source which is unlikely to significant affect migrating humpback whales based on an average migrating swim speed of 5 – 9 km/hr (Murray n.d).

7.4.8.6 Socio-economic Receptors

There are no direct impacts to socio-economic receptors from underwater sound. Indirect impacts may occur if impacts to fauna that are a value to a socio-economic receptors occur such as fishing and whale watching.

The severity of impact to socio-economic receptors from underwater sound is assessed as minor, and is of an acceptable level based on:

- Impacts to commercial fisheries and recreation fishing are not predicated as impacts to fish are not predicted based on the small distance (20 - 70 m) to the sound impact criteria as detailed in Section 7.4.8.4.
- Impacts to whale and other marine fauna watching or tours are not precited as sound levels above the sound impact criteria are not predicted in nearshore waters or areas where whale watching or other fauna watching occurs (Figure 7-9).

7.4.8.7 Cultural Values and Sensitivities

From Section 6.6.3, the following cultural values and sensitivities have been identified as potentially affect by light and the section where potential impacts have been assessed:

- Eels – see Section 7.4.8.4
- Fish – see Section 7.4.8.4
- Dolphins – see Section 7.4.8.2
- Blue whales – see Section 7.4.8.2
- Southern right whales -– see Section 7.4.8.2
- Orcas - – see Section 7.4.8.2
- Seals - – see Section 7.4.8.2

A summary of those assessment are provided below.

- Impacts to eels that may migrated through the Otway and Bass shelf to deeper waters are not predicted to be impacted as a study by Koster et al. 2021 tracked 16 shortfinned eels found that the average speed was 30.8 ± 7.3 km/day while eels were on the continental shelf and 29.7 ± 11.1 km/day while in deep water. Thus, migrating eels are unlikely based on the small distances to the 48 h recoverable injury (furthest 70 m) and 12 h TTS (furthest 160 m) sound exposure criteria, where migrating eels are unlikely to be present for a duration of time where impacts could occur.
- Impacts to fish are not predicted based on the small distance (20 - 70 m) to the sound impact criteria.
- The PTS and TTS 24 h sound criteria is based on a dolphin being exposed to the sound source over a period of 24 hours. As the distances to these criteria are small it is highly unlikely that dolphins would stay near the drill rig for up to 24 hours to experience PTS and TTS from drilling (130 m for 24 hours) or resupply (160 m for 4 hours) as the Sound EMBA is not within an area where they are undertaking biologically important behaviour.
- As detailed in Section 7.4.8.2, there is the potential for foraging blue whales and migrating southern right whales to be exposed to sound exposure criteria for 24 hr TTS and behavioural

response. Thus, Beach will implement a Whale Management Procedure (CM08) that includes whale observation and measures that have proven to be effective at preventing unacceptable impacts to foraging blue whales and migrating southern right whales as per Beach's previous Otway Drilling Campaign.

- The southern right whale reproduction BIA is outside of the sound EMBA and thus no impacts to the BIA are predicted.
- The PTS and TTS 24 h sound criteria is based on a whale being exposed to the sound source over a period of 24 hours. As the distances to these criteria are small it is highly unlikely that orcas would stay near the drill rig for up to 24 hours to experience PTS and TTS from drilling (130 m for 24 hours) or resupply (160 m for 4 hours) as the Sound EMBA is not within an area where they are undertaking biologically important behaviour.
- Breeding colonies for Australian fur seal and New Zealand fur seal known to occur along the Victorian coastline, including Deen Maar, and the west side of King Island are outside the sound EMBA.
- The PTS and TTS 24 h sound criteria is based on a seal being exposed to the sound source over a period of 24 hours. As the distances to these criteria are small it is highly unlikely that seals would stay near the drill rig for up to 24 hours to experience PTS and TTS from drilling (30 m for 24 hours) or resupply (90 m for 4 hours) as the Sound EMBA is not within an area where they are undertaking biologically important behaviour or within aggregation or haul-out areas.

In addition, continuous underwater sound has not been identified as an impact to submerged cultural heritage.

7.4.9 Demonstration that Impacts will be ALARP

ALARP decision context and justification	**ALARP Decision Context: Type B** Impacts from sound emissions are relatively well understood though there is the potential for uncertainty in relation to the level of impact. Activities are well practised, and there are no conflicts with company values, no partner interests, and no significant media interests. Additional controls may be required to ensure impacts can be managed to an acceptable level.
Adopted Control Measures	**Description**
CM01: Marine Assurance Process	Rig and vessels will have Preventative Maintenance System that provides a status on the maintenance of equipment and detailed manufacturer's specification on maintenance procedures for: • Equipment detail as a control in this EP will be inspected to ensure effective operation. • Power generation and propulsion systems on the MODU and vessels will be inspected to ensure efficient operation.
CM08: Whale Management Procedure	The Whale Management Procedure outlines specific measures to minimise anthropogenic noise threats to relevant species, including the implementation of safe operating distances between vessels and whales, pre-activity surveys for specific activities, night-time and low visibility controls and establishment of safe points for operational activities in accordance with the Safety Case and Well Integrity requirements.
CM05: Seabed Survey	A seabed survey will be undertaken prior to the commencement of the Drilling Program to allow for the consideration of the following in the final selection of well locations and drill rig position and location of mooring equipment: • Seabed habitat type to avoid areas of high relief outcrops, reefs or sponge beds that are likely to be associated with site-attached fish. • Shipwrecks and other maritime archaeological heritage. • Submerged cultural heritage and submerged cultural landscapes.

Additional Controls Assessed		
Control	**Cost/Benefit Analysis**	**Control Implemented**
Seasonal timing	Beach has determined that the risk to all threatened cetaceans that may be undertaking biologically important behaviour during the period of the Drilling Program cannot be avoided due to variability in timing of environmentally sensitive periods and unpredictable presence of some species, with blue whales potentially present in foraging areas between November to June (McCauley et al. 2018), and southern right whale typically present in the migration BIA from April to October (NCVA 2023h). Therefore, there is no period where avoidance of both species is possible. In addition, Beach is required to meet its requirements under the OPGGS Act and petroleum licence conditions to explore and development gas reserves within their petroleum titles. Titleholders must also P&A suspended wells to comply with the requirements under section 572 of the OPGGS Act to remove all structures, equipment and other property that is neither used nor to be used in connection with operations authorised by the title. To progress these petroleum activities, Beach is planning a rig campaign commencing	No

	no earlier than November 2024 (subject to rig availability). This rig campaign will be shared across Beach's Bass and Otway assets, along with other titleholders who also have drilling activities planned in the region. A rig has been secured by Beach along with three other consortium members operating in the Otway Basin. The driver behind the consortium approach is to realise efficiencies through the execution of multiple wells in one campaign, reducing mobilisation and demobilisation activities and shared use of aviation and shore base support. Being part of a consortium also provides the flexibility to negotiate rig slot sequencing with other operators therefore optimising rig utilisation and minimising down-time. As the Drilling Program could take up to 560 days there will be some overlap with periods when foraging blue whales and migrating southern right whales are in the Otway and Bass. Thus, in order to demonstrate, with a high level of confidence, that requirements of the Conservation Management Plan for the Southern Right Whale (DSEWPaC 2012a), draft National Recovery Plan for the Southern Right Whale (DCCEEW 2022a) and Conservation Management Plan for the Blue Whale (CoA 2015) will be met, Beach has undertaken a well-founded assessment of impacts to foraging blue whales and migrating southern right whales from the Drilling Program and made commitments to implement a Whale Management Procedure (CM08) that includes whale observation and measures that have proven to be effective at preventing unacceptable impacts to blue whales and southern right whales as per Beach's previous Otway Drilling Campaign.	
Anchoring of vessels	This control is not feasible for the support vessels based on: • Vessel standby activities require the vessel to be able to react immediately in the event of an issue on the drill rig and to prevent other marine users entering the 500 m petroleum safety zone. • Resupply operations require the vessel to use DP to maintain position adjacent to the platform to counter wind and current conditions.	No
Do not operate or limit the operation of drill rig thruster assisted mooring system	A review of 33 months of historical operational data from the North Sea indicates thrusters are typically not active (>96% of the time) and utilisation is otherwise limited low loads across a small number of thrusters for short periods, (typically hours) in response to metocean conditions. Evaluation of trade-offs indicates that not using the thruster assist mode increases the likelihood of inability to maintain station, loss of vessel stability due to mooring system fatigue, downtime associated with management of mooring system fatigue, such as anchor relay or conductor replacement, with associated increases in emissions, discharges, seabed impacts and drilling duration. Beach considers that the trade-offs associated with not using the thruster assist mooring system are grossly disproportionate to the benefit gained, being short-term infrequent reductions in variable non-impulsive noise levels.	No
Passive acoustic monitoring (PAM)	PAM can be used to detect marine mammal calls, and support sightings made by MMOs. Currently available PAM technologies are most useful in the detection of odontocetes such as sperm whales and dolphins, known	No

	to emit regular distinctive clicks and high frequency calls during long dives. However, technology development specific to low frequency whale detections is currently underway in Australia but is yet unproven. The cost of a PAM system is high and would require a number of permanent moored systems or multiple gliders around the Operational Area with real-time telemetry and analysis. Beach is working with other operators and acoustic detection companies to determine if it is feasible to use as a control for the Drilling Program but at this stage the technology is not yet ready for deployment.	
Aerial surveys	Aerial surveys were not seen as an effective control for the previous Otway Drilling Campaign due to issues with weather delaying flights. Aerial surveys for detection of whales is not required as monitoring activities can be effectively conducted by the MMO on vessels.	No
Satellite imagery	Satellite imagery can be used to gather oceanographic and biological information to support the understanding of presence of marine mammals in the area. Reliability is likely to be low given meteorological conditions in the area and need for cloudless conditions. Challenges identified with tasking conflicts and data accuracy to support identification to species, with limited additional benefit relative to adopted controls.	No
Drone surveys	Drones could provide a method of increasing the observation distance of MMOs. It is not known if drone surveys have been effectively used as a real-time monitoring method to date due to the physical range of drones being limited to 4 – 5km. In addition, drone operations are sensitive to wind limiting operations in the Otway and Bass. As MMOs will be present on the vessels there is a negligible observation benefit provided by drones. The associated costs, dropped object risk and operational limitations are disproportionate to the negligible environmental benefit.	No
Infra-red systems	Infra-red systems could enhance the ability of MMOs to visually detect the presence of whales within close proximity to the system. Infra-red systems are limited in their effective distance ranges and do not extend out to the distances required to make them effective. Poor performance of infra-red systems has been reported in sea states greater than Beaufort Sea State 4 and conditions such as fog, drizzle, rain limit detections (Verfuss et al. 2018, Smith et al. 2020). Reliability and effectiveness are unknown/ untested and considered lower than direct observations, with limited additional benefit relative to accepted controls.	No
Monitoring upwelling events	Monitoring precursors to upwelling events could inform the level of risk of blue whale encounter. There is a lag between changes in sea surface temperature and increased primary production leading to krill swarms, and the presence of feeding whales. This lag has been identified in some studies on upwelling / krill / blue whale foraging presence as between 1 to 4 months. As such, monitoring sea surface temperature and chlorophyll-a monitoring does not provide a robust prediction of blue whale feeding activity.	No

Consequence rating	Minor (1) to Moderate (2)
Likelihood of occurrence	NA
Residual risk	Low

7.4.10 Demonstration that Impacts will be of an Acceptable Level

Consequence rating	Minor (1) to Moderate (2)
Likelihood of occurrence	NA
Residual risk	NA
Acceptability Assessment	
To meet the principles of ESD	Sound emissions were assessed as having a Minor (1) to Moderate (2) consequence which is not considered as having the potential to result in serious or irreversible environmental damage. There is high confidence in the predicted level of impact as Beach has significant experience operating in the Otway and Bass based on their existing offshore developments and associated activities including the Beach Otway Drilling Campaign in 2021/2022.
Internal context	The proposed management of the impact is aligned with the Beach Environment Policy. The Drilling Program will be undertaken in accordance with the Implementation Strategy (Section 8).
External context	The merits of claims or objections raised by a relevant stakeholder have been adequately assessed and additional controls adopted where appropriate, as detailed in Section 4 Consultation. Impacts to King George whiting spawning and recruitment was raised by a stakeholder (Stakeholder ID 25165861) in relation to the Corner Inlet Fishery. Impacts have been assessed as per Section 7.4.8.4.
Other requirements	Underwater sound will be managed in accordance with legislative requirements. EPBC Regulations 2000 – Part 8 Division 8.1 interacting with cetaceans requirements are implemented as per CM08: Whale Management Procedure. Underwater sound is not listed as a threat in: • Recovery Plan for the Australian Sea Lion (DSEWPaC 2013b) • Recovery Plan for the White Shark (DSEWPaC 2013a) • National Recovery Plan for Albatrosses and Petrels (CoA 2022a) • Wildlife Conservation Plan for Seabirds (CoA 2020a) Underwater sound is listed as a threat in: • Conservation Management Plan for the Blue Whale (CoA 2015) • Conservation Management Plan for the Southern Right Whale (DSEWPaC 2012a) • Draft National Recovery Plan for the Southern Right Whale (DCCEEW 2022a) • Conservation Advice for Fin Whales (TSSC 2015f) • Conservation Advice for Sei Whales (TSSC 2015g) • Recovery Plan for Marine Turtles in Australia (CoA 2017b). • South-east Commonwealth Marine Reserves Network Management Plan (2013-2023) (DNP 2013) Relevant actions from the requirements that list underwater sound as a threat have been met as detailed.

	Actions from the Conservation Management Plan for the Blue Whale (CoA 2015) applicable to the Drilling Program in relation to assessing and addressing anthropogenic noise have been addressed as per: • Assessing the effect of anthropogenic noise on blue whale behaviour. Section 7.4.8.2 assesses the effects of anthropogenic noise from the Drilling Program on blue whale behaviour. • Anthropogenic noise in biologically important areas will be managed such that any blue whale continues to utilise the area without injury and is not displaced from a foraging area. Section 7.4.8.2 demonstrates that the activity can be conducted in a manner that is consistent with the conservation management plan and will not result in injury or displacement of pygmy blue whales from a foraging BIA. Actions from the draft National Recovery Plan for the Southern Right Whale (DCCEEW 2022a) applicable to the activity in relation to assessing and addressing anthropogenic noise have been addressed as per: • Anthropogenic noise in biologically important areas will be managed such that it does not prevent any southern right whale from utilising the area or cause injury (TTS and PTS) and/or disturbance. • Ensure environmental assessments associated with underwater noise generating activities include consideration of national policy (e.g., EPBC Act Policy Statement 2.1) and guidelines related to managing anthropogenic underwater noise and implement appropriate mitigation measures to reduce risks to southern right whales to the lowest possible level. Section 7.4.8.2 assesses the effects of anthropogenic noise from the Drilling Program on southern right whales and includes consideration of national policy and guidelines relevant to the Drilling Program. • Quantify risks of anthropogenic underwater noise to southern right whales, including behavioural disturbance, changes to vocalisations, and physiological effects to whales. Section 7.4.8.2 assesses the effects of anthropogenic noise from the Drilling Program. Management actions from the fin and sei whales conservation advice (TSSC 2015f, TSSC, 2016g) have been addressed as per: • An assessment of the impacts of increasing anthropogenic noise (including from seismic surveys, port expansion, and coastal development) has been undertaken as per Section 7.4.8.2. • The Whale Management Procedure will be implemented for fin and sei whales to ensure their ongoing recovery. As per the Recovery Plan for Marine Turtles in Australia (CoA 2017b), underwater sound is not predicted to impact the recovery of marine turtles as impacts as no marine turtle important habits are located within the area that maybe impacted by underwater sound as detailed in Section7.4.8.3. The South-east Commonwealth Marine Reserves Network Management Plan (2013-2023) (DNP 2013) requires that potential impacts of allowable activities on the conservation values of the marine reserves network are identified and avoided or mitigated by appropriate assessment and authorisation processes, such as the OPGGS Act. This has been addressed by the impact assessment in Section 7.4.8.5 and by the submission of this EP to NOPSEMA for acceptance as required under the OPGGS Act.
Monitoring and reporting	Marine Mammal Sighting Reports (Section 8.3.9).
Acceptability outcome	**Acceptable**

7.5 Physical Presence

7.5.1 Source of Aspect

While the rig is on a well location there will be a 500 m petroleum safety zone (PSZ) around the rig, and the mooring equipment will be located on the seabed out to 2 km from the well location.

The well heads and the PSZ will remain for the production life of the field for the Yolla 7 well and any of the exploration or appraisal wells that are commercially viable and suspended for future development.

If anchors are pre-laid, they may be in place for typically 1 month and up to 3 months prior to the rig being on location. The surface buoys associated with the anchors will be in place until the rig is anchored on location to drill the well. The surface buoys have a navigation light.

7.5.2 Extent and Duration of Aspect

Rig on location	
Extent	500 m petroleum safety zone (PSZ) 2 km caution zone where rig anchors are located
Duration	Drilling: up to 40 days per well. Completion: up to 20 days for one well, Yolla 7. Plug and abandonment: up to 20 days per well.
Permanent wells	
Extent	500 m petroleum safety zone (PSZ)
Duration	Production life of the field
Pre laid anchors	
Extent	2 km caution zone where rig anchors are located
Duration	Up to 3 months

7.5.3 Predicted Environmental Impacts

The physical presence of anchors, anchor surface buoys, rig exclusion zones and permanent well PSZs can result in the displacement of other marine users such as:

- Marine recreation and tourism.
- Petroleum titleholders.
- Commercial shipping.
- Commercial fishing.

The physical presence of rig anchors and permanent wellheads can result in snagging of fishing equipment.

7.5.4 EMBA

Predicted impacts from the physical presence of anchors, anchor surface buoys, rig exclusion zones and permanent well PSZs will be limited to the Operational Area.

Other marine user likely to occur within the Operational Area are:

- Marine recreation and tourism.
- Petroleum titleholders.
- Commercial shipping.
- Commercial fishing.

7.5.5 Predicted Level of Impact

7.5.5.1 Marine Recreation and Tourism

Marine recreation and tourism could be affected by restricted access to an area within the Operational Area. The Bass Operational Area is approximately 42 km from the nearest land and the closest point to the Otway Operational Area is 20 km from the Victorian coast.

Marine recreation and tourism is limited within the Operational Area due to the distances from shore and no issues related to restricted assess have been raised via stakeholder consultation or during Beach's Otway or Bass Operations.

The extent of the impact is predicted to be 500 m from the rig will on location. The consequence is assessed as Minor (1) and is of an acceptable level based on:

- A marine or tourism operator would have to avoid 500 m around the drill rig or suspended well, which is a very small area and will not result in a significantly longer sail time or increase in fuel use.
- The Operational Area has not been identified to contain any tourism areas or significant areas for recreational fishing.
- No issues have been raised to date in relation to exclusion of recreational fishing or marine tourism for Beach's existing offshore operations.
- Notices to Mariners will be issued for the Drilling Program and tourism operators can obtain updates from Beach in relation to the Drilling Program as per Consultation for Implementation of EP (CM03).

7.5.5.2 Petroleum Titleholders

The Otway Operational Area overlaps with the proposed Regia Marine Seismic Survey Activity Planning Area, TGS Marine Seismic Survey Operational Area and potential ConocoPhillips Drilling Operational Area. Beach is engaging with these companies to stay informed of activity timings to ensure activities can be undertaken in a manner that does not interfere with other marine users to a greater extent than is necessary for the exercise of right conferred by the titles granted. Impacts to other petroleum titleholders are not predicted.

Cumulative impacts associated with the seabed surveys and other activities in the Operational Areas are detailed in Section 7.14.

7.5.5.3 Commercial Shipping

The Operational Area includes major and minor shipping routes (Section 6.5.5).

The extent of the impact is predicted to be 500 m from the rig will on location. The consequence is assessed as Minor (1) and is of an acceptable level based on:

- A commercial vessel would have to avoid 500 m around the drill rig or suspended well, which is a very small area and will not result in a significantly longer sail time or increase in fuel use.
- No issues have been raised to date in relation to exclusion of shipping for Beach's existing offshore operations.
- Notices to Mariners will be issued for the Drilling Program and tourism operators can obtain updates from Beach in relation to the Drill Program as per Consultation for Implementation of EP (CM03).

7.5.5.4 Commercial Fishing

Beach commissioned a report by South East Trawl Fishing Industry Association (SETFIA) on fishing activity within the Operational Area (SETFIA 2023). Table 7-9 details the fisheries that overlap the Operational Area with number of vessels, percentage overlap and gear type based on data from the SETFIA report (SETFIA 2023). Note that the SETFIA report Otway Operational Area covers a slightly larger area than the Drilling Program Otway Operational Area.

SETFIA (2023) identified that the main fisheries that could be impacted by permanent exclusion area such as PSZs and well heads are the trawl, rock lobster and giant crab fisheries noting:

- Trawl data from the past twenty years showed that most fishing effort is between the 400 and 1,000 m isobath. This does not significantly impact the North T/30P Operational Area as trawl effort cuts across the south-western corner, however, the South T/30P Operational Area is directly over this relatively high traffic area. It is recommended that Beach avoid depths between the 400 - 1000m isobaths to minimise the impact on fishing.
- If the above is unavoidable then fishers may be due compensation and Beach should develop a policy on this.

Table 7-9: Fisheries that Overlap the Operational Area

Fishery	Operational Area		No Vessels	% Overlap	Gear
	Otway	Bass			
Gillnet Hook Trap Sector Shark Gillnet	✓	✓	Up to 8	0.9%	Demersal gillnet, auto longline, dropline, and demersal longline.
Commonwealth Trawl	✓	-	< 5	0.5%	Bottom otter trawl gear and Danish seine gear.
Southern Squid Jig	✓	-	Up to 5	3.1%	Squid jig.
Victorian Giant Crab	✓	-	Up to 15	81%	Baited pots.
Victorian Southern Rock Lobster	✓	-	Up to 15	4.2%	Baited pots.

The extent of the impact is predicted to be 500 m from the rig will on location for non-trawl fisheries and 2 km from the rig or pre laid anchor buoys for trawl fisheries whilst trawling. The consequence is assessed as Minor (1) and is of an acceptable level based on:

- A fishing vessel would have to avoid 500 m around the drill rig or suspended well, which is a very small area and will not result in a significantly longer sail time or increase in fuel use.
- To date commercial fishers and Beach existing operations have co-existed.
- Rock lobsters live in rocky reefs (VFA 2023b) and rocky reefs are not an appropriate substrate for wells thus it is unlikely for areas where rock lobster live and are caught to be within a PSZ.
- Notices to Mariners will be issued for the Drilling Program and commercial fisheries can obtain updates from Beach in relation to the Drill Program as per Consultation for Implementation of EP (CM03).
- Beach will implement an activity limitation where wells will not be located in water depths >400 m (CM09: Drilling Program). This limitation reduces any potential impact to commercial trawl and giant crab fisheries that were identify by SETFIA (2023) as having most fishing effort between the 400 and 1,000 m isobath.
- Beach will continue to consult with commercial fishers including SETFIA (CM03: Consultation for Implementation of EP) in relation to well locations and the process for compensation if fishing exclusion is unavoidable (CM04: Beach Fair Ocean Access Procedure).

7.5.5.5 Cultural Values and Sensitivities

First Nation cultural activities could be affected by restricted access to an area within the Operational Area.

The extent of the impact is predicted to be 500 m from the rig while on location. The consequence is assessed as Minor (1) and is of an acceptable level based on:

- No First Nation cultural activities have been identified to occur within the Operational Area via stakeholder consultation or during Beach's Otway or Bass Operations.

- Notices to Mariners will be issued for the Drilling Program and First Nation's people or groups can obtain updates from Beach in relation to the Drilling Program as per Consultation for Implementation of EP (CM03).

7.5.6 Demonstration that Impacts will be ALARP

ALARP decision context and justification	ALARP Decision Context: Type A Impacts from physical presence are well understood and there is nothing new or unusual. Good practice is defined, and uncertainty is minimal. There are no conflicts with company values, no partner interests and no significant media interests. Though objections or claims where raised by stakeholders in relation to physical presence they have been managed by additional controls. As the impact consequence is rated as Minor (1) applying good industry practice is sufficient to manage the impact to ALARP.
Adopted Control Measures	**Description**
CM01: Marine Assurance Process	Beach Marine Assurance System ensures that the rig and vessels meet relevant maritime laws and includes pre-commencement rig and vessel inspections of class certification requirements under the Navigation Act 2012 and associated Marine Orders, including but not limited to: • Marine Order 27 Safety of Navigation and Radio Equipment • Marine Order 30 Prevention of Collisions
CM02: Vessel and Rig Operating Procedures	A 500 m radius Petroleum Safety Zone (PSZ) will be published in the Government Notices Gazette for each new well location for the duration of the drilling and will remain in place for those wells which are suspended for future production. A 2 km radius cautionary zone will be in place around the rig when on location and will be monitored by a support vessel. At least one support vessel will accompany the rig when in operation and when safe to do so (e.g. outside of weather event), to manage interactions with other marine users.
CM03: Consultation for Implementation of EP	As per Section 4.1.16 Beach will undertake consultation for the implementation of the EP which will include at a minimum: • Notification to all relevant person regarding acceptance of the EP by NOPSEMA. • Commencement of activities, exclusion zones, vessel details, pre-lay of anchors and buoys, movement of drilling rig to new locations, during activity and cessation notification requirements. • On-water communication processes, including SMS messages and radio communication. • Consultation with relevant First Nations groups (Section 6.6.2) regarding identified cultural heritage and cultural landscapes in accordance with CM05: Seabed Survey. • Consultation with commercial fishing associations (and individual commercial fishers where identified) regarding well locations, the ongoing communication of Beach activities to their members, and applying CM04: Beach Fair Ocean Access Procedure. Under the Navigation Act 2012, the Australian Hydrographic Office (AHO) are responsible for maintaining and disseminating hydrographic and other nautical information and nautical publications such as Notices to Mariners. AMSA also issue radio-navigation warnings. Notifications to AMSA and AHO will be undertaken as detailed in Section 4.16.

	Relevant details in relation to the pre-laid anchor buoys, drill rig and vessels will be provided to the AHS and AMSA and to relevant stakeholders to ensure the presence of the drill and vessels are known.
CM04: Beach Fair Ocean Access Procedure	Beach's Fair Ocean Access Procedure was developed with input from commercial fishing industry organisations (Bass Strait Scallop Industry Association, Scallop Fisherman's Association of Tasmania, South East Trawl Fishing Industry Association and Tasmanian Seafood Industry Council. The procedure details the process whereby a commercial fisher can claim compensation for an economic loss associated with Beach's offshore activities where impacts cannot be avoided. An information sheet on the procedure is available in Appendix D.
CM06: Drill Rig Mooring Plan	Pre-laid anchors will have a surface buoy with navigation lighting and the position of the buoys will be included in the notification to AHS to be included in the AUSCOAST Warnings. Planned retrieval of all mooring equipment, including transponders, from the sea floor as soon as reasonably practicable within 3 months following the completion of the Drilling Program.
CM09: Drilling Program	Beach will implement an activity limitation where wells will not be located in water depths >400 m. This applies to the T/30P Operational Area where waters depths range from 55–992 m (T/30P South OA) and 111–578 m (T/30P North OA). Water depths >400 m have not been fully excluded from the activity as anchors may be required in these waters depths depending on the final well location. This limitation reduces any potential impact to commercial trawl and giant crab fisheries that were identify by SETFIA (2023) as having most fishing effort between the 400 and 1,000 m isobath. SETFIA (2023) recommended that Beach avoid depths between the 400–1000 m isobaths to minimise the impact on fishing.

7.5.7 Demonstration that Impacts will be of an Acceptable Level

Consequence rating	Minor (1)
Likelihood of occurrence	NA
Residual risk	NA
Acceptability assessment	
To meet the principles of ESD	Physical presence was assessed as having a Minor (1) consequence which is not considered as having the potential to result in serious or irreversible environmental damage. There is high confidence in the predicted level of impact as Beach has significant experience operating in the Otway and Bass based on their existing offshore developments and associated activities including the Beach Otway Drilling Campaign in 2021/2022.
Internal context	The proposed management of the impact is aligned with the Beach Environment Policy. Activities will be undertaken in accordance with the Implementation Strategy (Section 8).
External context	Stakeholder objections or claims have been assessed in relation to physical presence and appropriate controls have been adopted as detailed in Section 7.5.6. SETFIA (Stakeholder ID 1010) raised concerns in relation to impacts from permanent infrastructure in title T/30P on access to trawl and giant crab fisheries. SETFIA recommended that Beach avoid depths between the 400-1000 m isobaths to minimise the impact on fishing. Beach has implemented an activity exclusion where wells will not be located in water depths >400 m (CM09 Drilling Program). Seafood Industry Victoria (SIV) ((Stakeholder ID 1008) advised their position on compensation process with regard to displacement, primarily in nearshore lobster fishing areas. The area of displacement is very small and is not a primary lobster fishing area. Beach has implemented an activity exclusion where wells will not be located in water depths >400 m (CM09 Drilling Program) which will limit impacts to giant crab fisheries. In addition, Beach will continue to consult with commercial fishers including SETFIA (CM03: Consultation for Implementation of EP) in relation to well locations and the process for compensation if fishing exclusion is unavoidable (CM04: Beach Fair Ocean Access Procedure).
Other requirements	Physical presence will be managed in accordance with the applicable legislative requirements such as the Navigation Act 2012 and associated Marine Orders as detailed in Section 7.5.6.
Monitoring and reporting	Monitoring of potential impacts is undertaken via stakeholder consultation as detailed in Section 4.16.
Acceptability outcome	**Acceptable**

7.6 Seabed Disturbance

7.6.1 Source of Aspect

Planned activities that occur during the Drilling Program may result in seabed disturbance through various pathways, as summarised in Table 7-10 below.

Table 7-10: Pathways for seabed disturbance from planned activities

Activity	Description of pathway	Predicted impact footprint	Total for program
Rig mooring and BOP tethering	Anchors will be used to maintain position of the rig during normal operations.	Maximum of 12 anchors and chains. Footprint of up to: • 200 m^2 per anchor and chain. • 36,000 m^2 (15 x 12 x 200) for Drilling Program. Based on 16 wells at 15 locations the wells in T/L5 will use the same anchor system.	36,000 m^2
	Tethers or suction piles to hold the BOP in place may be required.	Footprint of up to: • 100 m^2 per well. • 1,600 m^2 (16 x 100) for Drilling Program.	1,600 m^2
	Transponder clump weight on seafloor. ~ 8 per well if required. Removed after positioning of rig.	Footprint of up to: • 0.2 m^2 each. • 16 m^2 (5 x 0.2 x 16) for Drilling Program	16 m^2
Drilling and P&A	For new wells: drilling of the surface hole section, including initial penetration of the seabed. For legacy suspended wells: removal of existing wellhead.	Per well: ~ 0.67 m^2 footprint (11 new wells + 5 legacy suspended wells)	10.72 m^2
	Following P&A operations and confirmation of the permanent barriers, the wellhead is cut with the use of a mechanical cutting tool and removed below the mudline (approximately 1.5 m) leaving no remaining well infrastructure on the seabed. The cutting process produces metal shavings (swarf), some of which remain on the seabed.	Swarf is expected to settle immediately and will likely remain within the existing footprint created by top-hole section drilling (surface disturbance is referenced above).	Included in surface hole above
	Drilling and P&A discharges (i.e. cement and drill cuttings) may be present up to 500 m from the well and are described and assessed in Section 7.8.	500 m from the well	Included in surface hole above
P&A	Suspended wells ROV dredging to expose guide bases and guideposts.	Beside the wellhead.	Included in surface hole above
Total for Drilling Program		0.038 km^2	

7.6.2 Extent and Duration of Aspect

Seabed Disturbance	
Extent	Per well: 0.0024 km^2 Drilling Program: 0.038 km^2
Duration	Recovery of seabed habitat within two months.

7.6.3 Predicted Environmental Impacts

Seabed disturbance from the Drilling Program can result in direct and indirect impacts:

- Benthic habitats including:
  - Injury/mortality to fauna from smothering or damage.
  - Change in water quality from sedimentation and turbidity.
  - Permanent or temporary change in habitat.
- Subsea infrastructure including UXO.
- Cultural values and sensitivities.

7.6.4 EMBA

Receptors impacted by seabed disturbance will be limited to the subsea infrastructure, benthic invertebrates, sessile epifauna and associated benthic habitats located at each well location. Wells will be located within the Operational Area.

Benthic habitat within the Otway Operational Area is a mixture of carbonate rich coarse to medium sands with areas of exposed limestone substrate (see Section 6.4.1.2). It is unlikely that extensive areas of rocky reefs or outcrops (where sponges, coral and more diverse fauna may be present) occur within the Otway Operational Area. The presence of wave-sculpted sediment and low-profile limestone pavement reef often inundated by sand has been identified in the Zeehan AMP, located 1 km south of the Otway Operational Area (DNP 2013). Prior to the commencement of the Drilling Program, a seabed survey will be conducted to obtain further information on the benthic habitat and species in the Otway Operational Area.

Benthic habitat within the Bass Operational Area has been recorded as flat and featureless with soft to soft alternating layers of silty carbonate clay and silty sands containing fragile white shell fragments (see Section 6.4.1.1) Prior to the commencement of the Drilling Program, a seabed survey will be conducted to obtain further information on the benthic habitat and species in the Bass Operational Area.

The Bass Strait region is known to consist of numerous marine invertebrates, sessile epifauna and other habitats. Studies by Wilson and Poore (1987) for the Museum of Victoria found the invertebrate diversity to be relatively high in southern Australian waters, despite patchy distribution of species and little evidence of any distinct biogeographic regions.

Ecological receptors likely to be present within the Operational Areas that may be impacted by seabed disturbance include:

- Benthic and filter-feeding epifauna (e.g. sponges, macroalgae, coral, bryozoans, molluscs, ascidians)
- Crustaceans (e.g. giant crabs, rock lobster, shrimp, krill)
- Echinoderms (e.g. urchins, sea cucumbers), and
- Annelids (e.g. polychaete worms).

Further details on benthic habitats and species assemblages are provided in Section 6.4.1.

Benthic habitats (sponges and associated fish species) are values of the West Tasmanian Canyons KEF. The West Tasmanian Canyons KEF overlaps the Otway Operational Area at T/30P. Further details on this KEF are provided in Section 6.2.15.6.

There are two commercially fished marine benthic invertebrate species which are present within the Operational Area which could be indirectly susceptible to seabed disturbance: the giant crab, and the southern rock lobster.

The Superloop Indigo Central telecommunications cable intersects the Otway Operational Area at T/30P. Further details on subsea cables are provided in Section 6.5.3.

As detailed in Section 6.5.4 the Otway Operational Area overlaps UXO Zone 1052 King Island.

First Nations submerged cultural heritage as detailed in Section 6.6.3.6 could be potentially impacted if within the area of seabed disturbance.

7.6.5 Predicted Level of Impact

7.6.5.1 Ecological Receptors

Benthic habitats and associated benthic fauna found within the Operational Area may be vulnerable to seabed disturbance from direct and indirect impacts. Benthic habitats found within the Operational Area include carbonate sands, low relief exposed limestone, sponge beds and unconsolidated sediment supporting bryozoans (IMAS 2017) and are found elsewhere within the region (see Section 6.4.1 for further details).

The biological impacts to benthic habitats and communities depends upon the equipment, footprint, seabed substrate, the frequency and the ecosystem's resilience (Watson et al. 2022). Furthermore, the recovery timeframe following seabed disturbance also varies on several factors, including the species and seabed substrate disturbed (Hiddink et al. 2017), the time of year, larval recruitment, and the local hydrodynamics (Dernie et al. 2003). There is limited information on the recovery of benthic habitats after the removal of anchors and other equipment.

A study on the recovery of seabed following bottom trawling activities identified faster recovery times for coarse-sediment (sand) compared to fine-sediment regions (Hiddink et al. 2017). Dernie et al. (2003) identified that benthic community recovery time following physical disturbance in soft sediment habitats varied from 64 days for low intensity disturbances, up to 208 days following higher intensity disturbance. For Drilling Program activities, it is expected that following the removal of anchors and

other equipment, disturbed areas will recolonise quickly as impacted areas are small and the benthic habitat is consistent with the low intensity disturbances recovery period, as identified by Hiddink et al. 2017 and Dernie et al. 2003. Impacts are not expected to cause long-lasting changes to population characteristics.

During anchoring activities and ROV dredging to expose legacy suspended well guide bases and guideposts, there is the potential for soft sediments to be suspended into the water column, which may affect benthic communities by decreasing water quality and/or light penetration near the seabed (NERA 2018). Given the hydrodynamics in open ocean areas, the area of decreased water quality is expected to be localised and temporary, as sediments would settle out of the water column relatively quickly. The seabed in the Operational Area likely consists of a sandy floor within an open ocean area thus impacts in relation to suspended sediments from benthic disturbance would be on a similar localised and temporary scale, or less, as identified by NERA (2018).

The extent of the impact is predicted to be 0.0024 km^2 per well and up to 0.038 km^2 for the Drilling Program. The consequence is assessed as Minor (1) and is of an acceptable level based on:

- The area of impact is predicted to be small (0.0024 km^2 per well location) compared to the extent of the distribution of the benthic habitats and associated benthic marine fauna found within the Operational Areas.
- The PMST Report did not identify any threatened benthic species or ecological communities, critical habitats or BIAs relevant to the benthic environment within the Operational Areas.
- Impacts are localised, with the impacted area of seabed predicted to return to pre-impacted state with no long-term effects to habitat, population characteristics or productivity.
- Given the hydrodynamics in open ocean areas, disturbed soft sediments would settle out of the water column relatively quickly with a localised and temporary decrease in water quality.
- Studies on benthic habitat and assemblages within the Operational Areas did not identify the area as unique, with similar benthic habitats found elsewhere in the region.
- Seabed surveys will be undertaken prior to the commencement of the Drilling Program to allow for the consideration of seabed habitat type in the final selection of well locations to avoid area of high relief outcrops, reefs or sponge beds.
- Seabed disturbance associated with the Drilling Program is not predicted to impact marine ecosystem integrity or functioning.

7.6.5.2 Conservation Values and Sensitivities

The northern T/30P Operational Area overlaps the West Tasmania Canyons KEF were up to two wells may be drilled. It is unlikely that drilling would occur within the KEF and would only occur after an assessment of the seabed identified a stable and relatively flat well location.

The extent of the impact is predicted to be 0.0024 km^2 per well and 0.0048or km^2 if two wells were drilling in the northern T/30P Operational Area. The consequence is assessed as Minor (1) and is of an acceptable level based on:

- The area of impact is predicted to be small (0.0024 km^2 per well location) compared to the extent of KEF.
- Impacts are localised, with the impacted area of seabed predicted to return to pre-impacted state with no long-term effects to habitat, population characteristics or productivity.
- Given the hydrodynamics in open ocean areas, disturbed soft sediments would settle out of the water column relatively quickly with a localised and temporary decrease in water quality.
- Seabed surveys will be undertaken of the KEF prior to the commencement of the Drilling Program within the KEF to allow for the consideration of seabed habitat type in the final selection of well locations to avoid area of high relief outcrops, reefs or sponge beds.
- Seabed disturbance associated with the Drilling Program is not predicted to impact marine ecosystem integrity or functioning of the KEF.

The Bass Operational Area contains one shipwreck, the SS Albert (Figure 6-5). No wrecks have been recorded within the Otway Operational Areas but as the Cape Otway to Port Fairy is known as the 'Shipwreck Coast' there is the potential for unknown shipwreck to be present in the Operational Area. As a seabed surveys will be undertaken prior to the commencement of the Drilling Program with the aim of detecting any seabed anomalies and the location of the SS Albert is known impacts to historic shipwrecks are not predicted.

7.6.5.3 Socio-economic Environment

Seabed disturbance has the potential to result in a change to benthic habitat and, subsequently, to associated benthic species. There are two commercially fished marine benthic invertebrate species which are present within the Otway Operational Area which could be indirectly susceptible to seabed disturbance: the giant crab, and the southern rock lobster (Section 6.5.13).

The Superloop Indigo Central telecommunications cable intersects the Otway Operational Area at T/30P (Section 6.5.3).

As detailed in Section 6.5.4 the Otway Operational Area overlaps UXO Zone 1052 King Island.

No socio-economic receptors where identified in the Bass Operational Area that would be affected by seabed disturbance.

The extent of the impact is predicted to be 0.0024 km^2 per well and 0.0192 km^2 for the Otway wells. The consequence is assessed as Minor (1) and is of an acceptable level based on:

- Giant crab and southern rock lobster are mobile species and are generally less vulnerable than sessile taxa to sedimentation, as they are able to move to areas with less sediment accumulation or by more efficiently physically removing particles (Fraser et al. 2017).
- The Operational Area intersect 15 of the 200 Victorian and 3 of the 797 Tasmanian southern rock lobster reporting blocks, and 13 of the 48 Victorian giant crab reporting blocks – all of which have recorded vessel activity with the last five years. The Operational Area do not overlap the Tasmanian giant crab reporting blocks.

- The southern rock lobster fishery has a stock status listed as sustainable for Victoria, Tasmania and South Australia (FRDC 2020). The giant crab fishery has a stock status listed as sustainable for Victoria and South Australia and depleted for Tasmania (FRDC 2020; 2020a). The depleted stock status for the Tasmanian giant crab fishery is based on data obtain from 2013-2014, and there has been insufficient data for the fishery since 2013 to determine if the stock is recovering (FRDC 2020a).

- Due to the spatial area of seabed which may be disturbed within the wider extent of available fishing grounds and the short duration of the activity, impacts to benthic species of commercial importance are predicted to be localised and insignificant at a population level.

- As rock lobster live in rocky reefs (VFA 2023b) it is unlikely that their habitat would be disturbed as rocky reefs are not an appropriate substrate for anchoring or drilling of a well.

- Seabed surveys will be undertaken prior to the commencement of the Drilling Program to allow for the consideration of seabed habitat type in the final selection of well locations to avoid area of high relief outcrops, reefs or sponge beds.

- The area of impact is predicted to be small compared to the extent of the available and utilised commercial fishing area for both the Victorian and Tasmanian giant crab and southern rock lobster fisheries.

- Via stakeholder consultation it was identified that the location of wells within T/30P could reduce the area available for fishing for giant crab and trawling (SETFIA Stakeholder ID 1010). Up to two wells may be drilled in T/30P with a disturbance area of up to 0.0048 km^2 which is a very small area of exclusion. As per CM03: Consultation for Implementation of EP, Beach will continue to consult with commercial fishers including SETFIA in relation to well locations and the process for compensation if fishing exclusion is unavoidable (CM04: Beach Fair Ocean Access Procedure).

- A seabed survey will be undertaken prior to the commencement of the Drilling Program (CM05) to identify the location of the Superloop Indigo Central telecommunications cable with the location included in the Drill Rig Mooring Plan (CM06) and Drilling Program (CM09) for wells in T/30P.

- The Otway Operational Area overlaps UXO Zone 1052 King Island which is within the 'slight potential' category', meaning there is confirmed history of military activities that may have resulted in numerous residual hazardous munitions, components, or constituents, but where confirmed UXO affected areas cannot be defined (DoD 2022). Beach undertook site surveys ahead of the Otway Drilling Campaign in 2021/2022, with no UXO identified. No UXO zones have been identified within the Bass Operational Area.

- A seabed survey will be undertaken prior to the commencement of the Drilling Program (CM05) to identify any UXO with any known locations included in the Drill Rig Mooring Plan (CM06) and Drilling Program (CM09) to avoid any impacts.

7.6.5.4 Cultural Values and Sensitivities

As detailed in Section 6.6 no First Nations underwater cultural heritage has been identified in the Operational Areas. As per the draft Guidelines for Working in the Near and Offshore Environment to Protect Underwater Cultural Heritage (DCCEEW 2023b) Beach has consulted with First Nations groups

and relevant underwater culture heritage researchers and organisations to understand what data could be obtained from the seabed survey that will be undertaken prior to the Drilling Program to identify First Nations submerged cultural heritage and submerged cultural landscapes (CM05). Data from seabed surveys will be provided to an appropriately qualified underwater archaeologist to identify submerged cultural heritage. Should any submerged cultural heritage be identified, Beach will consult with the relevant First Nations groups (see Section 6.6.2) and determine any exclusion areas or further cultural heritage management procedures that may be required. Thus, impacts to First Nations underwater cultural heritage are not predicted.

7.6.6 Demonstration that Impacts will be ALARP

Control, ALARP and acceptability assessment: Benthic disturbance	
ALARP decision context and justification	ALARP Decision Context: Type A Impacts from benthic disturbance are well understood and there is nothing new or unusual. Good practice is defined, and uncertainty is minimal. There are no conflicts with company values, no partner interests and no significant media interests. Though objections or claims where raised by stakeholders in relation to seabed disturbance they have been managed by additional controls. As the impact consequence is rated as Minor (1) applying good industry practice is sufficient to manage the impact to ALARP.
Adopted Control Measures	**Description**
CM03: Consultation for Implementation of EP	As per Section 4.16 Beach will undertake consultation for the implementation of the EP which will include at a minimum: • Consultation with relevant First Nations groups (section 6.6.2) regarding identified cultural heritage and cultural landscapes in accordance with CM05: Seabed Survey. • Consultation with commercial fishing associations (and individual commercial fishers where identified) regarding well locations, the ongoing communication of Beach activities to their members, and applying CM04: Beach Fair Ocean Access Procedure.
CM06: Drill Rig Mooring Plan CM09: Drilling Program	The following will be considered in the final selection of well locations, drill rig position and location of mooring equipment: • Seabed habitat type to avoid areas of high relief outcrops, reefs or sponge beds that are likely to be associated with site-attached fish. • Shipwrecks and other maritime archaeological heritage. • Submerged cultural heritage. • Location of the Superloop Indigo Central telecommunications cable for wells in T/30P to avoid any impacts to the cable. • Location of unexploded ordinances.
CM05: Seabed Survey	A seabed survey will be undertaken prior to the commencement of the Drilling Program to allow for the consideration of the following in the final selection of well locations and drill rig position and location of mooring equipment: • Seabed habitat type to avoid areas of high relief outcrops, reefs or sponge beds that are likely to be associated with site-attached fish. • Shipwrecks and other maritime archaeological heritage. • Submerged cultural heritage and cultural landscapes. • Location of the Superloop Indigo Central telecommunications cable for wells in T/30P to avoid any impacts to the cable. • Location of unexploded ordinances.

	Data from seabed surveys will be provided to an appropriately qualified underwater archaeologist to identify submerged cultural heritage and landscapes and provide an Underwater Cultural Heritage Report to Beach. Beach will assess the report and identify any areas of overlap and potential risks from proposed activities defined in this EP. Beach will share relevant information and assessments from the Seabed Survey, relevant to submerged cultural heritage and landscapes with relevant First Nations groups as identified in Section 6.6.2. Should any submerged cultural heritage be identified, Beach will report the findings in accordance with the *Underwater Cultural Heritage Act* 2018, and will consult with the relevant First Nations groups (as identified in Section 6.6.2) and determine any exclusion areas or further cultural heritage management procedures that may be required. Should any potential submerged cultural landscapes be identified, in consultation with the qualified underwater archaeologist, Beach will assess the report and identify any areas of overlap and potential risks from proposed activities defined in this EP. Beach will also consult with relevant First Nations groups (see Section 6.6.2) and determine any exclusion areas or further cultural heritage management procedures that may be required. The findings of Munkura v Santos will be applied in the assessment and consultation processes set out above.

Additional Controls Assessed		
Control	**Cost/Benefit Analysis**	**Control Implemented**
No anchoring, i.e. use of drill rig with Dynamic Positioning (DP) systems only (i.e. no anchors).	No anchoring of rig and support vessels within Operational Areas eliminates seabed disturbance from anchor and chain drag/ placement. Anchoring is required to position the drill rig. Evaluation of trade-offs indicates use of DP alone for maintaining station is feasible, however, would lead to disproportionately higher continuous noise impacts to sensitive receptors.	No
Use less or smaller anchors to reduce seabed disturbance	Minimises contact with seabed and resultant disturbance. The number and size of anchors used will be determined by the rig contractor, metocean conditions and safety risks as evaluated in the mooring plan. Reducing the recommended number of anchors represents an unacceptable HSE trade-off that is grossly disproportionate to the benefit gained.	No

7.6.7 Demonstration that Impacts will be of an Acceptable Level

Consequence rating	Minor (1)
Likelihood of occurrence	NA
Residual risk	NA
Acceptability assessment	
To meet the principles of ESD	Seabed disturbance was assessed as having a Minor (1) consequence which is not considered as having the potential to result in serious or irreversible environmental damage. There is high confidence in the predicted level of impact as Beach has significant experience operating in the Otway and Bass based on their existing offshore developments and associated activities including the Beach Otway Drilling Campaign in 2021/2022.

Internal context	The proposed management of the impact is aligned with the Beach Environment Policy. Activities will be undertaken in accordance with the Implementation Strategy (Section 8).
External context	The merits of claims or objections raised by a relevant stakeholder have been adequately assessed and additional controls adopted where appropriate, as detailed in Section 4 Consultation. Department of Defence (Stakeholder ID 1521) raised that UXO maybe present in the area. This has been assessed in this Section and a seabed survey will be undertaken prior to the commencement of the Drilling Program (CM05) to identify any UXO with any known locations included in the Drill Rig Mooring Plan (CM06) and Drilling Program (CM09) to avoid any impacts. A meeting was held with First Peoples - State Relations (Victoria) (Stakeholder ID 1458) and Heritage Victoria (Stakeholder ID 1561) to obtain advice to inform the seabed survey acquisition and subsequent proposed drilling and completions activities, to be able to identify underwater cultural heritage artifacts and features. Based on information from that consultation Beach has engaged a contractor who specialises in cultural mapping of submerged archaeology and landscapes to provide expertise in relation to identifying underwater cultural heritage. Beach will assess the findings of the survey in accordance with CM05 Seabed Survey and undertake further consultation in accordance with CM03 Consultation for Implementation of EP. SETFIA (Stakeholder ID 1010) raised concerns in relation to impacts from permanent infrastructure in title T/30P on access to trawl and giant crab fisheries. SETFIA recommended that Beach avoid depths between the 400-1000 m isobaths to minimise the impact on fishing. Beach has implemented an activity exclusion where wells will not be located in water depths >400 m (CM09 Drilling Program). Seafood Industry Victoria (SIV) (Stakeholder ID 1008) advised their position on compensation process with regard to displacement, primarily in nearshore lobster fishing areas. The area of displacement is very small and is not a primary lobster fishing area. Beach has implemented an activity exclusion where wells will not be located in water depths >400 m (CM09 Drilling Program) which will limit impacts to giant crab fisheries. In addition, Beach will continue to consult with commercial fishers including SETFIA and SIV (CM03: Consultation for Implementation of EP) in relation to well locations and the process for compensation if fishing exclusion is unavoidable (CM04: Beach Fair Ocean Access Procedure).
Other requirements	Legislative requirement: Section 572 of the OPGGS Act details the requirements for removal of property will be met for the Drilling Program.
Monitoring and reporting	A seabed survey will be undertaken prior to the commencement of the Drilling Program (CM05) to allow for the consideration of seabed disturbance in the final selection of well locations and drill rig position and location of mooring equipment.
Acceptability outcome	**Acceptable**

7.7 Planned Marine Discharges – Rig and Vessels

7.7.1 Source of Aspect

While undertaking the Drilling Program the rig and vessels will discharge the following to the marine environment:

- Brine, a by-product of the desalinisation process whereby dissolved salts and minerals are removed from seawater to produce purified freshwater.
- Putrescible waste, being organic waste materials that are prone to decomposition and decay.
- Cooling water, used to remove heat from equipment or processes to preventing overheating and maintain optimal operating conditions.
- Bilge water, a combination of various liquids, such as seawater, rainwater and water from various onboard sources including leaks, condensation, and wastewater.
- Grey water, wastewater generated from sources such as sinks, showers, bathtubs, and washing machines.
- Sewage from toilets.

Quantities of planned rig and vessels discharges are calculated based on the number of people on board (POB) and are provided in Table 7-11.

Table 7-11: Estimated Drill Rig and Vessel Discharges

Discharge Type	Quantity Rig (approx.) 140 POB	Quantity per vessel (approx.) 15 POB
Putrescible waste	280 kg / day (1-2 kg pp/day)	30 kg / day (1-2 kg pp/day)
Sewage & Grey water	63 m^3 / day (0.45 m^3 pp/day)	7 m^3 / day (0.45 m^3 pp/day)
Cooling Water	4,800 m^3/d combined (Rig + single vessel)	
RO Brine	170 m^3/day combined (Rig + single vessel)	

7.7.2 Extent and Duration of Aspect

Vessel and Drill Rig Operations - Drilling	
Extent	Operational Area Based on the furthest distance of impact.
Duration	560 days Operational marine discharges will be generated by the rig and vessels for the duration of the Drilling Program.

7.7.3 Predicted Environmental Impacts

Rig and vessel discharges have the potential to result in an impact to receptors in the marine environment from changes in water quality such as increased temperature, salinity, nutrients and the addition of chemicals and hydrocarbons.

As a result of a change in water quality, further impacts may include:

- Injury/mortality to fauna through toxicity.
- Behavioural changes if fauna habituate to putrescible waste as a food source.
- Changes to the functions, interests, or activities of other users.
- Changes to changes to aesthetic, and conservation values.

7.7.4 EMBA

Predicted impacts from rig and vessel marine discharges will be limited to the Operational Area.

Receptors potentially affected include:

- Water quality
- Ecological receptors, including plankton, fish, turtles, seabirds, and marine mammals.
- Conservation values and sensitivities.
- Cultural values and sensitivities.

7.7.5 Predicted Level of Impact

7.7.5.1 Water Quality

Rig and vessel discharges to the marine environment have the potential to alter water quality within the Operational Areas. Impacts to water quality will occur from:

- Intermittently elevated nutrient levels from sewage, putrescible waste, and grey water discharges, limited to 500 m from the rig and vessels based on discharges from a conservative 400 POB fixed facility (NERA 2017).
- Elevated water temperature from cooling water discharges, predicted to be less than 11°C above ambient within 100 m (horizontally) of the discharge point, and 10 m vertically (Woodside 2014).
- Elevated salinity levels and chemical additives from brine discharges, modelled by the US EPA as diluted 40-fold within 4 m with no ocean current (Woodside 2014).
- Intermittently elevated hydrocarbon levels within 100 m of bilge water discharge (Shell 2009), from engine oil, lubricants, fuel residues and other petroleum-based substances that may have leaked or spilled into the bilge.

The extent of the impact is predicted to be 500 m from the well. The consequence is assessed as Minor (1) and is of an acceptable level based on:

- Discharges will be of low toxicity with controls such as treatment and chemical assessment in place.
- Discharges will be intermittent and of a low volume and as the discharges are discharged into an open oceanic environment, they are predicted to mix rapidly with the surrounding waters returning to a pre-impacted state without any long-term impacts to water quality.
- Cumulative impacts from planned rig and vessel discharges may occur for short periods when support vessels are within 500 m of the rig, i.e. during resupply activities. The small quantities involved, and intermittent nature of the discharges are not predicted to increase the impact extent beyond 500 m based on discharges from a conservative 400 POB fixed facility (NERA 2017).

7.7.5.2 Ecological Receptors

Changes to water quality as a result of rig and vessel discharges could result in injury / mortality or a change in behaviour of plankton, fish, turtles, seabirds, and marine mammals within 500 m of the rig and vessels.

The extent of the impact is predicted to be 500 m from the well. The consequence is assessed as Minor (1) and is of an acceptable level based on:

- Early life stages of fish (embryos, larvae) and plankton would be most susceptible to toxic exposure from chemicals in discharges, as they are less mobile and therefore can become exposed at the discharge point. However, negligible effects are expected given previous studies on wastewater discharges which show no elevation in levels above background concentrations in proximity to the discharge point (Woodside 2008; 2014; Shell 2009). Therefore, considering the naturally high mortality of plankton and the rapid replacement of the species (Richardson et al. 2017) any impacts from short term exposure to low toxicity discharges are not expected have lethal effects to plankton that are ecologically significant or result in impacts along the food-chain, for example to foraging marine species.
- A distribution BIA for the white shark has been identified within the Operational Areas. Marine discharges from the rig or vessels are not identified as a threat in the Recovery Plan for the White Shark (Carcharodon carcharias) (DSEWPaC 2013a). Sharks will be transient through the area thus impacts are not predicted due to the low toxicity of discharges and rapid dilution as a result of oceanic conditions.
- No BIAs or protected habitat were identified for other fish species within the Operational Areas. Although a variety of fish species, including commercial species, maybe be present in the area, impacts are not predicted due to the low toxicity of discharges and rapid dilution as a result of oceanic conditions. In addition, the sporadic discharge of macerated food scraps over short durations and are not predicted to result in habituation to this food source.
- No BIAs or critical habitat were identified for marine turtles within the Operational Areas although some species may occur. Chemical and terrestrial discharge are identified as a threat in the Recovery Plan for Marine Turtles in Australia (CoA 2017b). However, due to the low toxicity of planned discharges and their rapid dilution as a result of oceanic conditions, along with the transient nature of these species within the area, impacts are not predicted to occur.

- The Operational Areas also overlap foraging BIAs for albatross, petrel, and shearwater species. As impacts to plankton and fish species are not predicted due to the low toxicity of planned discharges and their rapid dilution as a result of oceanic conditions, impacts to foraging seabirds are not predicted. In addition, the sporadic discharge of macerated food scraps over short durations and are not predicted to result in habituation to this food source.

- The Operational Areas are within pygmy blue whale foraging BIAs. Marine discharges from the rig or vessels are not identified as a threat to the recovery of pygmy blue whales within the Conservation Management Plan for the Blue Whale (DoE 2015). Marine pollution by acute and chronic chemical discharge is identified as a threat that has minor consequences to the population by only affecting individuals (DoE 2015). Due to the low toxicity of planned discharges and their rapid dilution as a result of oceanic conditions, impacts are not predicted to occur to foraging blue whales or krill that they forage on.

- The Operational Areas are within the southern right whale migration BIA. Marine discharges from the rig or vessels are not identified as a threat to the southern right whale recovery within the Conservation Management Plan for the Southern Right Whale (DSEWPaC 2012a). Marine pollution by acute and chronic chemical discharge is identified as a threat that has minor consequences to the population by only affecting individuals (DSEWPaC 2012a). Chemical pollution from sewage and other discharges is identified as a threat to the species, particularly within coastal BIAs where regular exposure may occur. However, due to the low toxicity of planned discharges and their rapid dilution as a result of oceanic conditions, along with the transient nature of these species within the area, impacts are not predicted to occur.

7.7.5.3 Conservation Values and Sensitivities

The Zeehan AMP is 1 km from the Operational Area therefore impacts from rig or vessels wastewater discharges are not predicted.

The northern T/30P Operational Area overlaps the West Tasmania Canyons KEF in water depths >150 m (Figure 7-10). Based on the low toxicity of planned discharges and their rapid dilution as a result of oceanic conditions impacts to the West Tasmania Canyons KEF productivity and biodiversity from canyon upwellings is not predicted.

7.7.5.4 Cultural Values and Sensitivities

As described in Section 6.6, Sea Country connection extends far beyond the current coastline and includes the Operational Areas. Vessel and rig discharges will be intermittent, low toxicity and of a low volume with the discharges predicted to mix rapidly with the surrounding waters returning to a pre-impacted state without any long-term impacts to water quality. In addition, impacts to eels and southern right whales that have cultural value to First Nations people (see Section 6.6.3) are not predicted. Thus, for rig and vessel discharges the consequence is assessed as Minor (1) to water quality and ecological receptors and therefore is assessed as Minor (1) for associated cultural values.

7.7.6 Demonstration that Impacts will be ALARP

ALARP decision context and justification	ALARP Decision Context: Type A Impacts from vessel and rig marine discharges are well understood and there is nothing new or unusual. Good practice is defined, and uncertainty is minimal. There are no conflicts with company values, no partner interests, and no significant media interests. As the impact consequence is rated as Minor (1) applying good industry practice (as defined in Section 2.7.2.1) is sufficient to manage the impact to ALARP.
Adopted Control Measures	**Source of good industry practice control measures**
CM01: Marine Assurance Process	The Protection of the Sea (*Prevention of Pollution from Ships Act* 1983) regulates Australian vessels with respect to ship-related operational activities and invokes certain requirements of the MARPOL Convention relating to discharge of noxious liquid substances including oil, sewage, putrescible waste, garbage, air pollution etc. These requirements are enacted through Marine Orders. Beach Marine Assurance System ensures that the rig and vessels meet relevant maritime laws and includes pre-commencement rig and vessel inspections of class certification requirements under the Navigation Act 2012 and associated Marine Orders, including but not limited to: • Marine Order 91 Marine Pollution Prevention – Oil. • Marine Order 95 Marine Pollution Prevention – Garbage. • Marine Order 96: Marine Pollution Prevention – Sewage.
	Rig and vessels will have Preventative Maintenance System that provides a status on the maintenance of equipment and detailed manufacturer's specification on maintenance procedures for: • Equipment detail as a control in this EP will be inspected to ensure effective operation. • Power generation and propulsion systems on the MODU and vessels will be inspected to ensure efficient operation.
CM12: Chemical Management Procedure	All chemicals that will or could be discharged to the marine environment must be assessed prior to use to ensure the lowest toxicity, most biodegradable and least accumulative chemicals are selected which meet the technical requirements of the application as per the Beach Chemical Management Procedure described in Section 8.5.3.

7.7.7 Demonstration that Impacts will be of an Acceptable Level

Consequence rating	Minor (1)
Likelihood of occurrence	NA
Residual risk	NA
Acceptability assessment	
To meet the principles of ESD	Planned marine discharges were assessed as having a Minor (1) consequence which is not considered as having the potential to result in serious or irreversible environmental damage. There is high confidence in the predicted level of impact as Beach has significant experience operating in the Otway and Bass based on their existing offshore developments and associated activities including the Beach Otway Drilling Campaign in 2021/2022.
Internal context	The proposed management of the impact is aligned with the Beach Environment Policy. Activities will be undertaken in accordance with the Implementation Strategy (Section 8).
External context	There have been no stakeholder objections or claims regarding planned marine discharges.
Other requirements	Planned marine discharge will be managed in accordance with legislative requirements. As per the impact assessment vessel and rig marine discharges will not: • Impact on the recovery of marine turtles as per the Recovery Plan for Marine Turtles in Australia (CoA 2017b). • Impact the recovery of the white shark as per the Recovery Plan for the White Shark (*Carcharodon carcharias*) (DSEWPaC 2013a). • Impact the recovery of the Australian sea lion as per the Recovery Plan for the Australian Sea Lion (DSEWPaC 2013b). • Impact the long-term survival and recovery of albatross and giant petrel populations breeding and foraging as per the National Recovery Plan for Albatrosses and Petrels 2022 (CoA 2022a). • Impact the conservation of listed seabirds in Australia and beyond as per the Wildlife Conservation Plan for Seabirds (CoA 2020a). • Impact the recovery of the blue whale as per the Conservation Management Plan for the Blue Whale (CoA 2015). • Impact the recovery of the southern right whale as per the Conservation Management Plan for the Southern Right Whale (DSEWPaC 2012a) or Draft National Recovery Plan for the Southern Right Whale (DCCEEW 2022a). • Impact sei or fin whales, covered by Conservation Advice for Fin Whales (TSSC 2015f) and Conservation Advice for Sei Whales (TSSC 2015g). • Impact the Zeehan AMP values as per the South-east Commonwealth Marine Reserves Network Management Plan (2013-2023) (DNP 2013).
Monitoring and reporting	Monitoring and reporting of vessel and rig discharges will be undertaken as detailed in Section 8.3.8.
Acceptability outcome	**Acceptable**

7.8 Planned Marine Discharges – Drilling and P&A

7.8.1 Source of Aspect

Drilling and P&A conducted during the Drilling Program will result in planned drilling discharges to the marine environment. Table 7-12 details the indicative drilling discharge per well.

In addition, barite, bentonite, and cement remaining at the end of the rig consortium campaign may be discharged to the marine environment by the last titleholder (which could potentially be Beach) using the rig. The Transocean Equinox bulk barite, bentonite and cement capacity is ~ 340 m^3, though the full volume would not be discharged as inventories will be minimised to as low as reasonably practicable during the final well(s) in the program taking into account well integrity and rig safety considerations.

Table 7-12: Indicative Drilling and P&A Discharges per Well

Discharge	Seabed	Surface
Blow-out Preventer (BOP)		
Potable water with 3 % water soluble control (hydraulic) fluid released every 7 days during function testing	2.2 m^3	-
Drilling		
Drill cuttings with seawater & PHG sweeps	393 m^3	-
Drill cuttings with residual water based drill fluids (WBDF)	-	185 m^3
Seawater & PHG sweeps	2,500 m^3	-
WBDF	-	1,500 m^3
Cement and Dry Bulk Material		
Cement discharge riserless section	40 m^3	-
Cement from testing, cementing and spoils	-	70 m^3
Completions – Yolla 7 only		
Completion fluids	-	400 m^3
Excess packer fluid	-	16 m^3
Excess suspension fluid	-	8 m^3
P&A Legacy Wells		
Calci-wash	2 m^3	
Insitu - inhibited water and brine		150 m^3
WBDF – drill out cement plug		250 m^3

7.8.2 Extent and Duration of Aspect

Drilling and P&A Discharge	
Extent	500 m Based on the furthest distance of impact.
Duration	Discharges will occur intermittingly during drilling and P&A.

7.8.3 Predicted Environmental Impacts

Planned drilling and P&A discharges have the potential to result in an impact to receptors in the marine environment from:

- Changes in water quality.
- Changes in sediment quality.
- Changes in benthic habitat composition.

As a result of changes in water and sediment quality and benthic habitat composition, further impacts may include:

- Injury /mortality to fauna through toxicity or physical smothering.

7.8.4 EMBA

Predicted impacts from drilling and P&A discharges will be limited to the Operational Area. Receptors potentially affected are:

- Water quality
- Sediment quality
- Benthic habitat
- Plankton, fish, turtles, and marine mammals.

Benthic habitats and ecological receptors are values of the following within the Operational Area:

- Conservation values and sensitivities
- Socio economic receptors
- Cultural values and sensitivities

7.8.5 Predicted Level of Impact – Blow-out Preventer Fluids

Planned discharges of BOP hydraulic fluids to the marine environment have the potential to change water quality near the discharge point.

Hydraulic fluids will be discharged to the marine environment during BOP installation and function testing every 7 days. Tests are expected to release 2200 L (2.2 m^3) of potable water with 3 % water soluble control fluid (hydraulic fluid). Additionally, smaller volumes will be released as the result of latching and unlatching the BOP at the start/end of each well.

Diluted hydraulic control fluids in potable water are water-based, low toxicity and readily biodegradable. Neff (2005) indicates that within well-mixed ocean waters, consistent with the Otway and Bass Operational Areas, fluids will have diluted by over 100-fold within 10 m of the discharge point. The extent within which the BOP hydraulic fluids would disperse is estimated to be within 100 m of the well location (Neff 2010).

The extent of the impact is predicted to be 100 m from the well. The consequence is assessed as Minor (1) and is of an acceptable level based on:

- Toxicity effects to water quality, sediment quality, benthic habitats, ecological receptors such as plankton, fish, turtles, and marine mammals, and commercial fisheries are not predicted based on diluted hydraulic control fluids in potable water are water-based, low toxicity and readily biodegradable.
- Impacts to the closest marine protected area, Zeehan AMP, at 1 km from the T/30P Operational Area are not predicted.
- The northern T/30P Operational Area overlaps the West Tasmania Canyons KEF in water depths >150 m (Figure 7-10). Impacts to key features such as low-relief bryozoan thicket, diverse sponge communities and associated fish species are not predicted based on the localised area of impact for a short period of time as the discharge disperses and that diluted hydraulic control fluids in potable water are water-based, low toxicity and readily biodegradable.
- Impacts to First Nations values and sensitivities such as whales, dolphins, seals, fish, and eels are not predicted based on the localised area of impact for a short period of time as the discharge disperses and that diluted hydraulic control fluids in potable water are water-based, low toxicity and readily biodegradable.
- Impacts to submerged cultural heritage are not predicted based on a seabed survey will be undertaken prior to the Drilling Program to identify First Nations underwater cultural heritage (CM05). Data from seabed surveys will be provided to an appropriately qualified underwater archaeologist to identify submerged cultural heritage. Should any submerged cultural heritage be identified, Beach will consult with the relevant First Nations groups (see Section 6.6.2) and determine any exclusion areas or further cultural heritage management procedures that may be required.

7.8.6 Predicted Level of Impact – Drill Cuttings and Fluids

Drill cuttings are the rock and sediment brought to the surface during drilling. These cuttings can include a mixture of clay, silt, sand, and rock, and can also contain small amounts of water-based drilling fluids. For the Drilling Program the top-hole sections will be drilled with seawater and pre-hydrated gel sweeps, with discharge to the seabed. Gel sweeps are typically comprised of seawater with high viscosity pre-hydrated bentonite. The seawater may be treated with caustic soda (NaOH) and/or soda ash (Na_2CO_3) to increase pH and alkalinity. The intermediate and reservoir-hole sections will be drilled with water based drilling fluid (WBDF). Seawater is the major component of WBDF to which bentonite clay, barite, brine and/or gellants (such as guar gum or xanthan gum) are added. Cuttings and associated drill fluids from these sections are routed back to the drill rig via the riser and processed by solids control equipment (shale shakers and centrifuges), where the WBDF is separated from the cuttings and recirculated in to the system for further use. The cuttings and remaining adhered WBDF discharged from the rig below the water surface.

It is standard practice within Australia to discharge drill cuttings and water-based drilling fluids overboard due to their low toxicity.

Drilling fluids will be discharged intermittently in batches ranging from around 1 m^3 to 400 m^3 and, depending on volume, may be discharged over a matter of minutes or over several hours.

During drilling of the top-hole section, discharges will occur at the seabed, resulting in a localised increase in turbidity immediately around the well. The cuttings and fluids will settle rapidly within

proximity to the wellhead, with finer particles (approx. 10% of the discharge volume) dispersing further within ocean currents (Hinwood et al. 1994).

For the cuttings discharge below the sea surface Hinwood et al. (1994) indicates that larger particles of cuttings and adhered muds (90-95%) discharged from the surface fall to the seabed within close proximity to the release point. Larger particles, representing approximately 90% of the mass of mud solids discharged to the marine environment will form a plume which settles swiftly on the seafloor (or until the plume entrains enough seawater to reach neutral buoyancy). The remaining 10% of the mass forms another plume in the upper water column which drifts with prevailing currents away from the source and is diluted rapidly in the water column (Neff 2005 2010). In well-mixed oceans, drilling cuttings and fluid plume is diluted by more than 100-fold within 10 m of the discharge (Neff 2005), with drilling fluid concentration falling to below acute toxicity threshold of 10,000 ppm within 100 m of the discharge source (Neff 2010).

Field studies summarised by International Association of Oil & Gas Producers (IAOGP) (2016), found that cuttings and adhered WBDF could be detected either visually or through increases in barium concentrations within 10 – 150 m of the source. Maximum height of the cuttings pile was usually <50 cm. When cuttings were discharged from the rig (i.e. at the surface), the increased depth allows small particles to disperse over greater distances, leaving thinner layers of cuttings near the well site – for example, WBDF cuttings discharged from a single well in >300 m water may disperse so widely they may not be detectable in sediments at any distance from the well.

Metals present in drilling fluids generally resemble that of marine sediments, albeit with concentrations of some metals higher than clean marine sediments (Neff 2005). Metals associated with WBDF drill cuttings have been shown to have a low bioavailability as they tend to remain in a non-ionic form, remaining bound to other compounds, presenting a low toxicity risk to marine fauna (Neff 2005). Other metals present in drilling wastes, mainly as salts, may originate from formation cuttings or from impurities in barite and other mud components. Barite used during the Drilling Program will have very low concentrations of mercury (Hg) and cadmium (Cd) (less than 1 mg/kg and 3 mg/kg respectively). A study investigating barite solubility and the release of trace metal compounds recorded that <1% of the mercury and 15% of the cadmium dissolved from the barite after one-week exposure to the marine environment (Crecelius et al. 2007). Further, these do not contribute to sediment toxicity due to their low bioavailability (Schaanning et al. 2002). Studies at three continental slope locations where drilling was undertaken in water depths between 37 and 119 m found that within a year, concentrations of barium and chemicals from WBDF and SBDF discharges reduced by 2.4 to 80% for barium and 65 to 99% for chemicals within 100 m of the discharge source (IAOGP 2016).

A study on the impacts of drilling in Bass Strait, where the Drilling Program will be conducted, by Terrens et al. (1998) observed biological effects within 100 m of the drilling site shortly after drilling; recovery of seabed communities across the area were reported within four months. This study found that after 11 months SBDF was not detectable in sediments, indicating that recovery of the seabed is through a combination of dispersion and biodegradation. Neff (2010) found that recolonisation of SBDF mud-cuttings piles in cold-water marine environments began within one to two years of ceasing discharges once the hydrocarbon component of the cutting piles biodegraded. Thus, for WBDF recolonisation would be faster as there is no hydrocarbon component.

A recent study on the Northwest Shelf (Jones et al. 2021), where in-situ surveys were undertaken during a drilling campaign, suggest a zone of high impact surrounding the drill centre up to 50–75 m in all directions which would have been caused by cuttings and fluid discharges from the drill rig.

Outside this zone was an area of medium impact up to approximately 200 m where there were clear losses of epifauna, but nevertheless sponges and soft corals were still observed.

Marine fauna that are exposed in the laboratory or field to cuttings in sediments do not bioaccumulate significant quantities of metals (Hartley et al. 2003). There is some evidence of a limited bioavailability of a few metals, such as lead and zinc, which are present in cuttings piles; however, doubt remains that metal bioaccumulation in marine fauna from cuttings piles is sufficient to cause harmful effects in marine fauna living on or near cuttings piles (OSPAR 2019). Neff (2010) concludes that, due to a lack of toxicity and low bioaccumulation potential of drilling fluids, the effects of drilling discharges are highly localised and are not expected to spread through the food web.

Hinwood et al. (1994) explain that the main environmental disturbance from discharging drilling cuttings and fluids is associated with the smothering and burial of sessile benthic and epibenthic fauna. Many studies have shown that the effects on seabed fauna and flora from the discharge of drilling cuttings with water-based muds are minimal, although the presence of drilling fluids in the seabed close to the drilling location (<500 m) can usually be detected chemically (e.g. Cranmer 1988, Neff et al. 1989, Hyland et al. 1994, Daan & Mulder 1996, Currie and Isaacs 2005, OSPAR 2009, Bakke et al. 2013).

Pre- and post-drilling ROV surveys which documented physical smothering effects from WBDF cuttings within 100 m of the well were compared and found that outside the area of smothering, fine sediment was visible on the seabed up to 250 m from the well (Jones et al. 2006, 2012). After three years, there was significant removal of cuttings particularly in the areas with relatively low initial deposition (Jones et al. 2012). The area impacted by complete cuttings cover had reduced from 90 m to 40 m from the drilling location, and faunal density within 100 m of the well had increased considerably and was no longer significantly different from conditions further away.

The extent of the impact is predicted to be 500 m from the well. The consequence is assessed as Minor (1) and is of an acceptable level based on:

- Toxicity effects to water quality, sediment quality, benthic habitats, and ecological receptors such as plankton, fish, turtles, and marine mammals are not predicted based on:
    - WBDF have been shown to have little or no toxicity to marine organisms due to the inert / PLONOR (Poses Little or No Risk to the Environment) nature of its components (Jones et al. 1996, Neff 2005). One, insoluble, component of water-based mud discharges is barite (or Barium sulphate) which has been widely shown to accumulate in sediments following drilling (reviewed by Hartley 1996) and is of low bioavailability and toxicity to benthic organisms.
    - All chemicals used in the drill fluids will be rated Gold/Silver/D or E through Oslo and Paris Conventions (OSPAR) and Offshore Chemical Notification Scheme (OCNS) or have a complete risk assessment.
    - Barite used during the Drilling Program will have very low concentrations of mercury (Hg) and cadmium (Cd) (less than 1 mg/kg and 3 mg/kg respectively) as recommended by the International Finance Corporation (IFC) EHS Guidelines Offshore Oil and Gas Development – Drilling Fluids and Drilled Cuttings Guidance (IFC 2015).
    - In well-mixed oceans, comparable to Otway and Bass Operational Area, drilling cuttings and fluid plume is diluted by more than 100-fold within 10 m of the discharge (Neff 2005), with

drilling fluid concentration falling to below acute toxicity threshold of 10,000 ppm within 100 m of the discharge source (Neff 2010). Neff (2005) states that planned drilling discharges are unlikely to cause harm to communities of water column plants and animals due to the rapid mixing and dilution of the drilling mud and cuttings plume.

- Marine fauna exposed in the laboratory or field to cuttings in sediments did not bioaccumulate significant quantities of metals (Hartley et al. 2003).
- Neff (2010) concludes that, due to a lack of toxicity and low bioaccumulation potential of drilling fluids, the effects of drilling discharges are highly localised and are not expected to spread through the food web.

- Smothering and burial of sessile benthic and epibenthic fauna may occur out to 100 m of the well with recovery of seabed communities within four months to 3 years based on Jones et al. (2012), Terrens et al. (1998) and Neff (2010). No threatened ecological communities have been identified within the Operational Areas and seabed surveys will be undertaken prior to the commencement of the Drilling Program to allow for the consideration of seabed habitat type in the final selection of well locations to avoid area of high relief outcrops, reefs or sponge beds. Thus, impacts are predicted to be localised and not impact marine ecosystem integrity or functioning.
- Impacts to the closest marine protected area, Zeehan AMP, at 1 km from the T/30P Operational Area are not predicted.
- The northern T/30P Operational Area overlaps the West Tasmania Canyons KEF in water depths >150 m (Figure 7-10). Impacts to key features such as low-relief bryozoan thicket, diverse sponge communities and associated fish species are not predicted based on the localised area of impact for a short period of time as the discharge disperses and that diluted hydraulic control fluids in potable water are water-based, low toxicity and readily biodegradable.
- Impacts to First Nations values and sensitivities such as whales, dolphins, seals, fish, and eels, and submerged cultural heritage are not predicted based on the localised area of impact for a short period of time as the discharge disperses and that diluted hydraulic control fluids in potable water are water-based, low toxicity and readily biodegradable.
- Impacts to First Nations values and sensitivities such as whales, dolphins, seals, fish, and eels are not predicted as toxicity effects to fish including eels and marine mammals such as whales, dolphins and seals are not predicted. Changes to water quality will be localised within 500 m of the well and temporary as any discharged fluids will rapidly disperse.
- Impacts to submerged cultural heritage are not predicted based on a seabed survey will be undertaken prior to the Drilling Program to identify First Nations underwater cultural heritage (CM05). Data from seabed surveys will be provided to an appropriately qualified underwater archaeologist to identify submerged cultural heritage. Should any submerged cultural heritage be identified, Beach will consult with the relevant First Nations groups (see Section 6.6.2) and determine any exclusion areas or further cultural heritage management procedures that may be required.

7.8.7 Predicted Level of Impact – Cement and Dry Bulk Materials

Cement is listed as a substance that is considered to pose little or no risk to the environment (OSPAR 2021).

It is estimated that approximately 40 m^3 of cement will be discharged to the seabed per well which has the potential to smother and permanently alter the benthic substrate. Cement discharged at the seabed is not expected to disperse as it is designed to set in a marine environment and will therefore set in-situ. BP (2013) modelled a 200 t (~83 m^3) cement discharge at the seabed and found changes to the benthic environment were limited to 10 m.

Cement discharged at the sea surface is expected to be a combination of cement slurry and wash water and will be a maximum of 70 m^3 per well, and an additional 25 m^3 at the final well location. The surface discharge of cement can cause increased turbidity in the water column and result in a temporary change in surface water quality. However, cement particles are expected to disperse under the action of metocean conditions and eventually settle out of the water column.

Modelling of surface cement discharges of approximately 78 m^3 over one hour, conducted for BP (2013), resulted in a suspended solid concentration between 0.005-0.05 mg/m^3 within the extent of the plume (approximately 150 m horizontal and 10 m vertical) over two hours. Four hours post-discharge concentrations were <0.005 mg/m^3. The volume modelled is slightly greater than the maximum surface discharge volume predicted for the Drilling Program, therefore it is predicted that the concentration of suspended sediments would be lower.

The extent of the impact is predicted to be 150 m from the well. The consequence is assessed as Minor (1) and is of an acceptable level based on:

- Cement is inert and considered to pose little or no risk to the environment (OSPAR 2021). Thus toxicity impacts to benthic habitats and ecological receptors such as plankton, fish, turtles, and marine mammals are not predicted.
- Seabed impacts are predicted to be limited to within 10 m of the well location. No threatened ecological communities have been identified within the Operational Areas and seabed surveys will be undertaken prior to the commencement of the Drilling Program to allow for the consideration of seabed habitat type in the final selection of well locations to avoid area of high relief outcrops, reefs or sponge beds.
- Turbidity impacts from the surface discharge of cement or other dry bulk materials are predicted to last less than four hours and be restricted to with approximately 150 m horizontal and 10 m vertical.
- Cement, bentonite and barite are listed as a substance that is considered to pose little or no risk to the environment (OSPAR 2021).
- Jenkins and McKinnon (2006) reported that levels of suspended sediments greater than 500 mg/l are likely to produce a measurable impact upon larvae of most fish species and levels of 100 mg/l where exposure occurs for greater than 96 hours may also affect the larvae of some species. Jenkins and McKinnon (2006) further indicate that levels of 100 mg/l may affect the larvae of several marine invertebrate species. It is understood that the egg and larval stages are more vulnerable to suspended particles than other life stages. Modelling conducted by BP (2013)

detailed that particulate concentrations within the cement discharge plume 2 hours after the start of discharge were in the 5-50 mg/l and 4 hours after the start of the discharge, the modelling indicates that the plume will have completely dispersed to particulate concentrations of less than 5 mg/l. Thus, impacts to fish including eggs and larva are not predicted.

- Impacts to the closest marine protected area, Zeehan AMP, at 1 km from the T/30P Operational Area are not predicted.

- The northern T/30P Operational Area overlaps the West Tasmania Canyons KEF in water depths >150 m (Figure 7-10). At the predicted particulate concentrations of 5-50 mg/l after 2 hours and 5 mg/l after 4 hours particulate concentrations of less than 5 mg/l. Total suspended solids (TSS) measured as part of the Otway Seabed Survey detailed that TSS at the closest sample point (Thylacine) to the West Tasmania Canyons KEF ranged from 2.4 mg/l to 9.7 mg/l (Ramboll 2020). As cement discharge TSS may be elevate above background levels for up to 4 hours within a distance of 150 from the well and a maximum of two wells may be undertaken within T/30P smothering impacts to sponges associated with the canyon heads are highly unlikely.

- Impacts to First Nations values and sensitivities such as whales, dolphins, seals, fish, and eels are not predicted as cement is inert and considered to pose little or no risk to the environment (OSPAR 2021) and the turbidity plume is temporary and suspended sediments are below levels where measurable impact upon larvae of most fish species which are likely to be more sensitive than eels and whales, dolphins and seals may be present.

- Impacts to submerged cultural heritage are not predicted based on a seabed survey will be undertaken prior to the Drilling Program to identify First Nations underwater cultural heritage (CM05). Data from seabed surveys will be provided to an appropriately qualified underwater archaeologist to identify submerged cultural heritage. Should any submerged cultural heritage be identified, Beach will consult with the relevant First Nations groups (see Section 6.6.2) and determine any exclusion areas or further cultural heritage management procedures that may be required.

7.8.8 Predicted Level of Impact – Completion Fluids

For the scope of this EP, well completions will be undertaken for Yolla 7 in the Bass Basin. Fluids are used to run well completions and to ensure that the wellbores and casings are clear of solids, debris, and other containments. Completion, packer, and suspension fluids will consist of brines (chlorides of calcium, potassium or sodium, or a bromide solution) and or water with additives that may include:

- Biocide, oxygen scavenger, corrosion inhibitor and pH buffer (soda ash or caustic soda).
- Bromides.
- Hydrate inhibitor (methanol, monoethylene glycol (MEG).
- Viscosifier and surfactants.

The base case is to unload the Yolla 7 well to the gas plant, with clean up to the rig a contingency option. If clean up to the gas plant is not deemed feasible, then the completion fluids will be discharged to sea. If there is the potential for oil to be present from any formation water or condensate present in the wellbore, the completion fluids will be tested and discharged only if the oil in water content is below 30 ppm. Fluid not meeting this criterion will be stored for onshore disposal.

The extent of the impact is predicted to be within 10 m from the well. The consequence is assessed as Minor (1) and is of an acceptable level based on:

- Completion, packer, and suspension fluids mainly consist of inert brine/or water which are on the OSPAR List of Substances Used and Discharged Offshore which Are Considered to Pose Little or No Risk to the Environment (PLONOR). In addition chemical additives such as soda ash, methanol and MEG are also classed as PLONOR.

- Other chemicals used in the fluids will be rated Gold/Silver/D or E through Oslo and Paris Conventions (OSPAR) and Offshore Chemical Notification Scheme (OCNS) or have a complete risk assessment. Thus, toxicity impacts to marine fauna are not predicted.

- Pelagic marine fauna and plankton may be exposed to low-level (30 ppm at point of discharge) concentrations of formation hydrocarbons via the discharge of completion brine at the Yolla 7 well location. OSPAR (2014) details that the predicted no effect concentration (PNEC) for marine organisms exposed to dispersed oil is 70.5 ppb which is significantly less than 30 ppm that will be potentially discharged if formation hydrocarbons are present. Additionally, the PNEC value is based upon no observed effect concentrations after exposure to certain concentrations for an extended period that was greater than 7 days (OSPAR 2014). The discharge of treated brine and formation water during well completion activities are both intermittent and short in duration.

- Modelling by Beach (AECOM 2020) for the produced formation water discharge at the Yolla Platform indicates that upon discharge, hydrocarbon and other chemical concentrations are rapidly diluted and reach the no observable effect concentration (i.e., no observable impact, noting this is a higher level of protection than the 99% species protection level) in the range of 1.5 - 7.3 m from the discharge point across a range of flow rates and ocean currents. The volume of formation hydrocarbons associated with the completion brine would be significantly less than the produced formation water discharge (100 – 300 m^3/day), the completion brine and any hydrocarbons would be rapidly diluted close to the discharge point.

- Toxicity effects to water quality, sediment quality, benthic habitats, ecological receptors such as plankton, fish, turtles, and marine mammals, and commercial fisheries are not predicted based on the rapid dilution of discharge completions brine and any associated hydrocarbons.

- There are no marine parks or key ecological features within or adjacent to the Yolla 7 well.

- Impacts to First Nations values and sensitivities such as whales, dolphins, seals, fish, and eels are not predicted based on the rapid dilution of discharge completions brine and any associated hydrocarbons.

- Impacts to submerged cultural heritage are not predicted based on a seabed survey will be undertaken prior to the Drilling Program to identify First Nations underwater cultural heritage (CM05). Data from seabed surveys will be provided to an appropriately qualified underwater archaeologist to identify submerged cultural heritage. Should any submerged cultural heritage be identified, Beach will consult with the relevant First Nations groups (see Section 6.6.2) and determine any exclusion areas or further cultural heritage management procedures that may be required.

During the P&A of the five legacy suspended wells, discharges will occur from cleaning of wellhead equipment, if required, insitu fluids within the wells, and WBDF from the drilling out of the existing cement plugs.

Wellhead cleaning may be required to access the wellhead. A product such as calci-wash which consists of <0.05% CaCl in water may be used to dissolve calcareous marine growth.

Insitu fluids differ between wells, as detailed in Table 3-4, but includes a mixture of WBDF and inhibited brine (KCl or NaCl). Inhibitor chemicals include corrosion inhibitor, biocide, and oxygen scavenger. As the legacy wells have not been completed or used for hydrocarbon production, hydrocarbons are unlikely to be present in the existing suspension fluids. It is estimated that insitu fluids discharges could be up to ~150 m^3 for each legacy suspended well.

WBDF discharges from drilling out of the existing cement plugs is estimated to be ~250 m^3 for each legacy suspended well.

The extent of the impact is predicted to be within 500 m from the well. The consequence is assessed as Minor (1) and is of an acceptable level based on:

- Toxicity effects to water quality, sediment quality, benthic habitats, and ecological receptors such as plankton, fish, turtles, and marine mammals are not predicted based on:
    - Calci-wash which consists of <0.05% CaCl is listed as on the OSPAR List of Substances Used and Discharged Offshore which Are Considered to Pose Little or No Risk to the Environment (PLONOR).
    - Insitu fluids are WBDF and inert brine, and chemicals used in the fluid will be rated Gold/Silver/D or E through Oslo and Paris Conventions (OSPAR) and Offshore Chemical Notification Scheme (OCNS) or have a complete risk assessment. This, toxicity impacts to marine fauna are not predicted.
    - As detailed in Section 7.8.6, WBDF have been shown to have little or no toxicity to marine organisms due to the inert / PLONOR (Poses Little or No Risk to the Environment) nature of its components (Jones et al. 1996, Neff 2005). One, insoluble, component of water-based mud discharges is barite (or Barium sulphate) which has been widely shown to accumulate in sediments following drilling (reviewed by Hartley 1996) and is of low bioavailability and toxicity to benthic organisms.
    - All chemicals used in the drill fluids will be rated Gold/Silver/D or E through Oslo and Paris Conventions (OSPAR) and Offshore Chemical Notification Scheme (OCNS) or have a complete risk assessment.
    - Barite used during the Drilling Program will have very low concentrations of mercury (Hg) and cadmium (Cd) (less than 1 mg/kg and 3 mg/kg respectively) as recommended by the International Finance Corporation (IFC) EHS Guidelines Offshore Oil and Gas Development – Drilling Fluids and Drilled Cuttings Guidance (IFC 2015).
    - In well-mixed oceans, comparable to Otway and Bass Operational Area, drilling cuttings and fluid plumes diluted by more than 100-fold within 10 m of the discharge (Neff 2005), with drilling fluid concentration falling to below acute toxicity threshold of 10,000 ppm within 100

m of the discharge source (Neff 2010). Neff (2005) states that planned drilling discharges are unlikely to cause harm to communities of water column plants and animals due to the rapid mixing and dilution of the drilling mud and cuttings plume.

- Marine fauna exposed in the laboratory or field to cuttings in sediments did not bioaccumulate significant quantities of metals (Hartley et al. 2003).
- Neff (2010) concludes that, due to a lack of toxicity and low bioaccumulation potential of drilling fluids, the effects of drilling discharges are highly localised and are not expected to spread through the food web.

- Smothering and burial of sessile benthic and epibenthic fauna may occur out to 100 m of the well with recovery of seabed communities within four months to 3 years based on Jones et al. (2012), Terrens et al. (1998) and Neff (2010). No threatened ecological communities have been identified within the Operational Areas and seabed surveys will be undertaken prior to the commencement of the Drilling Program to allow for the consideration of seabed habitat type in the final selection of well locations to avoid area of high relief outcrops, reefs, or sponge beds. Thus, impacts are predicted to be localised and not impact marine ecosystem integrity or functioning.
- Impacts to the closest marine protected area Apollo AMP, are not predicted as the nearest P&A well is ~ 50 km from the AMP.
- Impacts to the West Tasmania Canyons KEF are not predicted as the nearest P&A well is ~17 km from the KEF.
- Impacts to First Nations values and sensitivities such as whales, dolphins, seals, fish, and eels are not predicted as toxicity effects to fish including eels and marine mammals such as southern right whales are not predicted. Changes to water quality will be localised within 500 m of the well and temporary as any discharged fluids will rapidly disperse.
- Impacts to submerged cultural heritage are not predicted based on a seabed survey will be undertaken prior to the Drilling Program to identify First Nations underwater cultural heritage (CM05). Data from seabed surveys will be provided to an appropriately qualified underwater archaeologist to identify submerged cultural heritage. Should any submerged cultural heritage be identified, Beach will consult with the relevant First Nations groups (see Section 6.6.2) and determine any exclusion areas or further cultural heritage management procedures that may be required.

7.8.9 Demonstration that Impacts will be ALARP

ALARP decision context and justification	ALARP Decision Context: Type A Impacts from planned drilling and P&A discharges are well understood and there is nothing new or unusual. Good practice is defined, and uncertainty is minimal. There are no conflicts with company values, no partner interests, and no significant media interests. As the impact consequence is rated as Minor (1) applying good industry practice (as defined in Section 2.7.2.1) is sufficient to manage the impact to ALARP.
Adopted Control Measures	**Description**
CM01: Marine Assurance Process	Rig and vessels will have Preventative Maintenance System that provides a status on the maintenance of equipment and detailed manufacturer's specification on maintenance procedures for: • Equipment detail as a control in this EP will be inspected to ensure effective operation. • Power generation and propulsion systems on the MODU and vessels will be inspected to ensure efficient operation.
CM05: Seabed Survey	A seabed survey will be undertaken prior to the commencement of the Drilling Program to allow for the consideration of the following in the final selection of well locations and drill rig position and location of mooring equipment: • Seabed habitat type to avoid areas of high relief outcrops, reefs or sponge beds that are likely to be associated with site-attached fish. • Shipwrecks and other maritime archaeological heritage. • Submerged cultural heritage and submerged landscapes.. Data from seabed surveys will be provided to an appropriately qualified underwater archaeologist to identify submerged cultural heritage and landscapes and provide an Underwater Cultural Heritage Report to Beach. Beach will assess the report and identify any areas of overlap and potential risks from proposed activities defined in this EP. Beach will share relevant information and assessments from the Seabed Survey, relevant to submerged cultural heritage and landscapes with relevant First Nations groups as identified in Section 6.6.2. Should any submerged cultural heritage be identified, Beach will report the findings in accordance with the *Underwater Cultural Heritage Act* 2018, and will consult with the relevant First Nations groups (as identified in Section 6.6.2) and determine any exclusion areas or further cultural heritage management procedures that may be required. Should any potential submerged cultural landscapes be identified, in consultation with the qualified underwater archaeologist, Beach will assess the report and identify any areas of overlap and potential risks from proposed activities defined in this EP. Beach will also consult with relevant First Nations groups (see 6.6.2) and determine any exclusion areas or further cultural heritage management procedures that may be required. The findings of Munkura v Santos will be applied in the assessment and consultation processes set out above.
CM06: Drill Rig Mooring Plan CM09: Drilling Program	A seabed survey will be undertaken prior to the commencement of the Drilling Program to allow for the consideration of the following in the

	final selection of well locations, drill rig position and location of mooring equipment: • Seabed habitat type to avoid areas of high relief outcrops, reefs or sponge beds that are likely to be associated with site-attached fish. • Shipwrecks and other maritime archaeological heritage. • Submerged cultural heritage.
CM09: Drilling Program	Only water based drilling fluids will be used for the Drilling Program. Solids control equipment consisting of shale shakers and centrifuges will be used once the riser is in place to reduce the concentration of drilling fluid on cuttings prior to discharge, thereby reducing the total volume of drilling fluid discharged to sea. The shale shakers will be fitted with screens that meet American Petroleum Institute (API) standards for particle size cut points. Centrifuges will be used as required to remove additional finer drilled cuttings/solids that are too small for the shale shakers. Barite will have low concentrations of mercury and cadmium (less than 1 mg/kg and 3 mg/kg respectively). Residual water based drill fluids, brine, completion fluids, cement, barite and bentonite will be used for subsequent wells, and provided to the next operator at the end of the rig consortium campaign, or if these options are not feasible, discharged to the marine environment. Inventories will be minimised towards the end of the rig consortium sequence to ensure minimum required inventory (considering minimum contingencies and well control requirement) for the last well in the sequence to reduce discharges to as low as practically possible. This control addresses adherence to international best practice standards: • Environmental, Health, and Safety Guidelines Offshore Oil and Gas Development (IFC 2015) – Drilling Fluids and Drilled Cuttings Guidance Number 53 requires consideration of discharges of drilling fluids including chemical content. • Environmental, Health, and Safety Guidelines Offshore Oil and Gas Development (IFC 2015) – Drilling Fluids and Drilled Cuttings Guidance Number 59 requires that environmental hazards related to residual chemical additives on discharged cuttings are reduced through the drilling fluid selection.
CM12: Chemical Management Procedure	All chemicals that will or could be discharged to the marine environment must be assessed prior to use to ensure the lowest toxicity, most biodegradable and least accumulative chemicals are selected which meet the technical requirements of the application as per the Beach Chemical Management Procedure described in Section 8.5.3. This control addresses adherence to: Environmental, Health, and Safety Guidelines Offshore Oil and Gas Development (IFC 2015) – Drilling Fluids and Drilled Cuttings Guidance Number 59 that requires operators to carefully select drilling fluid additives, considering their concentration, toxicity, bioavailability, and bioaccumulation potential.

Additional Controls Assessed		
Control	**Cost/Benefit Analysis**	**Control Implemented**
Skip and ship drilling/cement waste to shore	Eliminates discharges to sea therefore reducing potential impacts to the marine environment. Evaluation of trade-offs indicates that the implementation of skip and ship – i.e. additional storage space for containment of waste, increased transfers to vessels/shore base, increased fuel usage, increased crane movements and increased HSE risks – would introduce significant cost and effort that is grossly disproportionate to the benefit.	No
Riserless Mud Recovery System	Riserless Mud Recovery System recirculates drill cuttings and fluids from the top-hole of the well eliminating discharge to the seabed (when applied in conjunction with containment and transfer to shore). Riserless Mud Recovery System may also be implemented where shallow hazards are anticipated. Given that low to no toxicity water-based fluids will be used for riserless drilling sections and shallow hazards are not anticipated, there is limited technical benefit in utilising this system and it would introduce significant cost and effort that is grossly disproportionate to the benefit.	No
Additional solids control equipment	Additional equipment such as thermal desorption and thermomechanical cleaning are used to reduce the volume of oil on cuttings when synthetic based drill fluids are used. As water-based drill fluids are to be used for the Drilling Program there is no environmental benefit of using this equipment.	No
Not discharging remaining bulk barite, bentonite, or cement at the end of campaign, blowback into vessel.	Bulk barite, bentonite or cement that remains in rig tanks is typically required to be removed by rig contractor prior to end of contract. Bulk materials 'pumped back' or 'blown back' into trucks has high risk of injury and explosive force due to the pressure. Many suppliers do not permit blowback operations into their trucks due to major safety concerns. Discharge of bulk materials, if not taken by the next operator at the end of the rig consortium campaign, will be discharged as a campaign one off activity. Inventory will be minimised as per CM09.	No

7.8.10 Demonstration that Impacts will be of an Acceptable Level

Consequence rating	Minor (1)
Likelihood of occurrence	NA
Residual risk	NA
Acceptability assessment	
To meet the principles of ESD	Planned drilling and P&A discharges were assessed as having a Minor (1) consequence which is not considered as having the potential to result in serious or irreversible environmental damage. There is high confidence in the predicted level of impact as Beach has significant experience operating in the Otway and Bass based on their existing offshore developments and associated activities including the Beach Otway Drilling Campaign in 2021/2022.

Internal context	The proposed management of the impact is aligned with the Beach Environment Policy. Activities will be undertaken in accordance with the Implementation Strategy (Section 8).
External context	There have been no stakeholder objections or claims regarding drilling and P&A discharges.
Other requirements	Drilling and P&A discharges will be managed in accordance with legislative requirements. The Minamata Convention covers all aspects of the life cycle of mercury, controlling and reducing mercury across a range of products, processes, and industries. Australia ratified the Minamata Convention on 7 December 2021. Countries that have ratified the Convention are bound by international law to put controls in place to manage emissions, releases and disposal of mercury and mercury compounds. At present there are no specific guidelines regarding acceptable levels of mercury waste in drilling fluids. The discharge of drill fluids and cuttings to the marine environment is considered to be standard practice in industry. For the Drill Program barite mercury and cadmium concentrations will be managed in accordance with IFC EHS Guidelines – Offshore Oil and Gas Development (2015) that represent good international industry practice. As per the impact assessment drilling marine discharges will not: • Impact on the recovery of marine turtles as per the Recovery Plan for Marine Turtles in Australia (CoA 2017b). • Impact the recovery of the white shark as per the Recovery Plan for the White Shark (*Carcharodon carcharias*) (DSEWPaC 2013a). • Impact the recovery of the Australian sea lion as per the Recovery Plan for the Australian Sea Lion (DSEWPaC 2013b). • Impact the long-term survival and recovery of albatross and giant petrel populations breeding and foraging as per the National Recovery Plan for Albatrosses and Petrels 2022 (CoA 2022a). • Impact the conservation of listed seabirds in Australia and beyond as per the Wildlife Conservation Plan for Seabirds (CoA 2020a). • Impact the recovery of the blue whale as per the Conservation Management Plan for the Blue Whale (CoA 2015). • Impact the recovery of the southern right whale as per the Conservation Management Plan for the Southern Right Whale (DSEWPaC 2012a) or Draft National Recovery Plan for the Southern Right Whale (DCCEEW 2022a). • Impact sei or fin whales, covered by Conservation Advice for Fin Whales (TSSC 2015f) and Conservation Advice for Sei Whales (TSSC 2015g). • Impact the Zeehan AMP values as per the South-east Commonwealth Marine Reserves Network Management Plan (2013-2023) (DNP 2013).
Monitoring and reporting	Monitoring and reporting of drilling discharges will be undertaken as detailed in Section 8.3.8.
Acceptability outcome	**Acceptable**

7.9 Establishment of Invasive Marine Species

7.9.1 Source of Aspect

The introduction of invasive marine species (IMS) could occur during rig and vessel operations as a result of:

- Discharge of ballast water from rig or vessels containing foreign species.
- Translocation of species through biofouling of:
  - Rig pontoons and anchors.
  - Vessel hull and niches such as sea chests, bilges, and strainers.

Successful IMS invasion requires the following three steps:

- Colonisation and establishment of the marine pest on a vector (e.g., vessel hull) in a donor region (e.g., home port).
- Survival of the settled marine species on the vector during the voyage from the donor to the recipient region (e.g., Operational Area).
- Colonisation (e.g., dislodgement or reproduction) of the marine species in the recipient region, followed by successful establishment of a viable new local population.

7.9.2 Extent and Duration of Aspect

Extent	Operational Areas Introduction of IMS could occur within the Operational Areas when the rig and vessels are present.
Duration	560 days Introduction of IMS during the Drilling Program.

7.9.3 Predicted Environmental Impact

IMS may become established where conditions are suitable, and these species may have impacts on local ecological and economic values. However, establishment of IMS is mostly likely to occur in shallow waters in areas where large numbers of vessels are present and are stationary for an extended period.

If the risk of establishment of IMS is realised this could result in a change in ecosystem dynamics which may include a reduction in native marine species diversity and abundance, displacement of native marine species, socio-economic impacts on commercial fisheries, and changes to conservation values of protected areas and First Nations cultural values and sensitivities.

7.9.4 EMBA

The risk of introduction of IMS could occur within the Operational Areas. Receptors potentially directly affected marine invertebrates and benthic habitats, within indirect affect to commercial fisheries, conservation values of protected areas and First Nations cultural values and sensitivities.

7.9.5 Predicted Level of Risk

Successful translocation and establishment of IMS into a new environment depends on several factors. Water currents, upwellings, habitat type, water depth, wave exposure, water temperature, salinity and the distance from the coast are all natural dispersion barriers which have been shown to limit the successful establishment and reproduction of IMS populations (Forrest et al. 2009).

More than 250 marine species have been introduced into Australian waters from around the world. Many of these species remain inconspicuous, but a few have established large populations and become pests. It is estimated that one in each six to 10 introduced marine species will become a pest (DCCEEW 2024l). Typical habitats of the species currently listed on the Marine Pest website (DAFF 2024) are shallow marine water areas for example Portland and Port Phillip Bay.

The risk of an IMS being able to successfully establish itself will depend on depth, distance from the coast, water movement and latitude. It has been found that highly disturbed environments (such as marinas) are more susceptible to colonisation than open-water environments, where the number of dilutions and the degree of dispersal are high (Paulay et al. 2002). The risk of an IMS being able to successfully establish itself will depend on depth, distance from the coast, water movement and latitude. The probability of successful IMS settlement and recruitment will decrease in well mixed, deep ocean waters away from coastal habitats (Geiling 2014) such as the Operational Areas. In addition, an IMS travelling through several latitudes will also have to survive significant temperature and salinity changes.

In the event of an IMS being introduced to the marine environment, successful colonisation is dependent upon suitable substrate availability. The Operational Areas do not present a location conducive to marine pest survival as they are primarily in water depths greater than 50 m and in an open-water environment.

The probability of successful IMS settlement and recruitment decreases in well-mixed, deep ocean waters away from coastal habitats. IMS colonisation also requires a suitable habitat in which to establish itself, such as rocky and hard substrates or subsea infrastructure. The Australian Government Bureau of Resource Sciences (BRS) established that the relative risk of an IMS becoming established around Australia decreases with distance from the coast. Modelling conducted by BRS (BRS 2007) estimates: 33% chance of colonisation at 3 nm, 8% chance at 12 nm, and 2% chance at 24 nm.

The Operational Areas do not present a benthic habitat that is typically favourable to IMS survival. The Bass Operational Area is approximately 23 nm from the nearest land and the at the closest point the Otway Operational Area is 11 nm from the Victorian coast.

The introduction of IMS has the potential to result in changes to the functions, interest, or activities of other users such as tradition, recreational and commercial fisheries. Marine pest species can deplete fishing grounds and aquaculture stock, with between 10% and 40% of Australia's fishing industry being potentially vulnerable to marine pest incursion.

Given the impact of a successful IMS colonisation has the ability to significantly impact local species and thus change local epifauna and infauna populations permanently, which could also impact State and Commonwealth fisheries, the consequences have been evaluated as Serious. However, it is considered such an event is Remote due to the implementation of the Beach Domestic IMS Biofouling Risk Assessment Process and unfavourable conditions within the Operational Areas required for

colonisation. In addition, there has been no IMS introductions from Beach's previous Otway Drilling Campaign and ongoing activities in the area.

7.9.6 Demonstration that Risk will be ALARP

ALARP decision context and justification	ALARP Decision Context: Type B The risk of IMS is well understood and there is nothing new or unusual. On the basis of the impact assessment completed, Beach considers the control measures identified are appropriate to manage the risks associated with the risk of introduction and establishment of IMS.
Adopted Control Measures	**Source of good practice control measures**
CM19: Beach Domestic IMS Biofouling Risk Assessment Process	Drill rig and support vessels mobilised from domestic waters to undertake activities within the Operational Areas will complete the Beach Domestic IMS Biofouling Risk Assessment Process as detailed in the Beach Introduced Marine Species Management Plan (S400AH719916) prior to the initial mobilisation into the Operational Areas. The Beach Domestic IMS Biofouling Risk Assessment Process: • Validates compliance with regulatory requirements (Commonwealth and State) in relation to biosecurity prior to engaging in activities within the Operational Areas. • Identifies the potential IMS risk profile of vessels and submersible equipment prior to deployment within the Operational Areas. • Identifies potentially deficiency of IMS controls prior to entering the Operational Areas. • Identifies additional controls to manage IMS risk. • Prevents the translocation and potential establishment of IMS into non-affected environments (either to or from the Operational Areas).

Additional Control Measures Assessed

Control	Control Type	Cost/Benefit Analysis	Control Implemented?
Only use rigs/vessels that are based in Victoria to reduce the potential for introducing IMS.	Equipment	Specialised drill rig and support vessels are likely required to undertake the activity. Using rigs and vessels that are based in Victoria (if available) may reduce the likelihood of introducing an IMS, but this would depend on the IMS risk level of the port where the vessel is based. The control measures that are to be implemented are required to be undertaken for vessels from any port in Victoria or Australia. Thus, there is limited environmental benefit associated with implementing this response.	No

7.9.7 Demonstration that Risks will be of an Acceptable Level

Consequence rating	Serious (3)
Likelihood of occurrence	Remote (1)
Residual risk	Low
Acceptability assessment	
To meet the principles of ESD	The risk of the establishment of IMS was assessed as Low and the consequence was assessed as Serious (3) which has the potential to result in serious or irreversible environmental damage. However, this is assessed as acceptable based on: • There is little uncertainty associated with this aspect as the activities are well known, the cause pathways are well known, and activities are well regulated and managed. • The implementation of controls make it a remote likelihood that IMS will be introduced from the activity resulting in a low residual risk. • It is not considered that there is significant scientific uncertainty associated with this aspect. Therefore, the precautionary principle has not been applied. There is high confidence in the predicted level of risk as Beach has significant experience operating in the Otway and Bass based on their existing offshore developments and associated activities including the Beach Otway Drilling Campaign in 2021/2022.
Internal context	The proposed management of the impact is aligned with the Beach Environment Policy. Activities will be undertaken in accordance with the Implementation Strategy (Section 8).
External context	There have been no stakeholder objections or claims regarding the introduction or establishment of IMS in relation to the activity.
Other requirements	The impact will be managed in accordance with legislation requirements and guidance, including: • Offshore Installations - Biosecurity Guide (DAFF 2023a) • National Biofouling Management Guidance for the Petroleum Production and Exploration Industry (MPSC 2018) • Australian Ballast Water Management Requirements (CoA 2020) and Australian Biofouling Management Requirements (DAWE 2022) gives effect to the Biosecurity Act 2015 and associated regulations; International Convention for the Control and Management of Ships' Ballast Water and Sediments (Ballast Water Convention) and relevant guidelines or procedures adopted by the Marine Environment Protection Committee of the International Maritime Organization (IMO) • IMO Biofouling Guidelines There are no EPBC management plans (management plans, recovery plans or conservation advice) which relate specifically to IMS introduction and establishment as a threat. The South-east Commonwealth Marine Reserves Network Management Plan 2013-23 (DNP 2013) identifies IMS, and diseases translocated by shipping, fishing vessels and other vessels as a threat to the AMP network. The implementation of the controls make it remote that IMS will be introduced from the Drilling Program and spread to AMPs.
Monitoring and reporting	Impacts as a result of the introduction of IMS will be reported in accordance with the Section 8.3.1.

Acceptability outcome	Acceptable

7.10 Fauna Interaction

7.10.1 Source of Aspect

The presence of moving rig, vessels and helicopter may result in unplanned interactions with marine fauna, such as vessel and aircraft collisions.

Collision with marine fauna may occur as a result of:

- Rig transit, towing and positioning.
- Vessel operations.
- Helicopter operations.

7.10.2 Extent and Duration of Aspect

Extent	Operational Areas Interactions with marine fauna could occur within the Operational Area when the rig, vessels and helicopter are present.
Duration	560 days Unplanned Interactions with marine fauna may occur during the Drilling Program.

7.10.3 Predicted Environmental Imapcts

Interaction with marine fauna can result in environmental impacts including:

- Injury / mortality.
- Change in behaviour.

7.10.4 EMBA

Predicted impacts resulting from rig, vessel and/or helicopters movements will be limited to the Operational Areas.

Ecological receptors potentially at risk from rig, vessel and/or helicopters movements are:

- Sharks, seals, seabird, turtles, and marine mammals.

These ecological receptors are values of the following within the Operational Area:

- Conservation values and sensitivities
- Cultural values and sensitivities

Receptors which are the most susceptible to vessel collisions are typically characterised as large or slow-moving marine fauna that commonly dwell near the surface and frequent areas associated with a high level of vessel traffic. Species which have either a limited, threatened or geographically concentrated population are also a concern. Cetaceans and marine turtles have been identified as vulnerable to vessel collisions within the National Strategy for Mitigating Vessel Strike of Marine Megafauna (DoEE 2017). However, other species such as pinnipeds and sharks can also be at risk of a

vessel collision. Birds moving through the Operational Areas may be at risk of interaction with rig infrastructure, such as the derrick, or a collision with helicopter when in use.

7.10.5 Predicted Level of Risk

7.10.5.1 Ecological Receptors

The National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Megafauna identifies that the consequence of a vessel strike can range from low impact to extreme depending on the circumstance (DoEE 2017). Injuries sustained from vessel collisions are not always lethal. However, many incidents which may not result in direct mortality often result in injuries to the back of the animal and the dorsal fin, resulting in a loss of blood, possible infection, and reduced swimming efficiency, eventually causing an overall reduction in fitness of the individual (van Waerebeek et al. 2006). Jensen and Silber (2003) analysed 292 reported incidents with large cetaceans and identified only seven individuals which appeared to have no signs of injury (Jensen and Silber 2004).

Studies have found that the overall impact and potential fauna mortality in the event of a vessel strike is directly linked to vessel speed, with studies demonstrating an escalation in speed to cause an increase in injury severity to large cetaceans (Vanderlaan and Taggart 2007). Slower moving vessels provide greater opportunity for both fauna and vessel to avoid collision. The most severe injuries have been identified to be caused by vessels travelling faster than 14 knots (Jensen and Silber 2004, Laist et al. 2001). Furthermore, large vessels (>80 m) with modern hull shapes are also correlated with increased injury severity (Laist et al. 2001). Vessel speed may also result in animals, including large whales, being drawn laterally towards the hull of the vessel (Silber et al. 2010).

The behavioural traits of certain species can also make them more vulnerable to vessel and aircraft strike such as slow swimming or flying speed, and the habituation and general lack of awareness of vessel or aircraft noise and the associated danger posed. Some species spend more time at the surface when resting, foraging, or mating making them more vulnerable to vessel strike (DoEE 2017).

White Shark

The Operational Areas intersect with the distribution BIA for the white shark which is listed as vulnerable. There is limited data regarding strikes to shark species such as white sharks, likely due to lack of collisions being noticed and lack of reporting (Peel et al. 2016).

The extent of the area of risk of interaction with the white shark is within the Operational Area and the risk could occur while the Drilling Program is undertaken. The consequence is assessed as Minor (1) and likelihood as highly unlikely, and the risk is of an acceptable level based on:

- Collisions are not listed as a threat within the Recovery Plan for the White Shark (DSEWPaC 2013a).
- A vessel strike to a shark is considered highly unlikely as it has not happened to date in 15 years of Beach's activities within the Otway and Bass.
- Rig and vessel movements in the Operational Areas will be low (≤ 10 knots as per CM02: Vessel and Rig Operating Procedures) which affords protection to fauna as the most severe injuries have been identified to be caused by vessels travelling faster than 14 knots (Jensen and Silber 2004, Laist et al. 2001).

- A marine mammal observer will be present on each support vessel to detect the presence of marine fauna and provide instruction to avoid collisions where feasible as per CM08: Whale Management Procedure.
- The consequence of a strike on a single animal is not predicted to affect the overall population or recovery of the white shark.

Marine Reptiles

The Operational Area PMST Report (Appendix E. 1) identified three marine turtle species are likely or may occur within the Operational Areas though no BIAs or habitat critical to the survival of the species were identified. No biologically important behaviours were identified.

Vessel strikes have been identified as a threat to marine turtles within the Recovery Plan for Marine Turtles in Australia (CoA 2017b). However, there is a limited amount of available data regarding vessel strike to fauna such as marine turtles; potentially due to a lack of vessel collisions being noticed, and a lack of reporting (Peel et al. 2016).

Marine turtles are most vulnerable to vessel collisions when they are either resting or returning to the surface to breathe. Studies have demonstrated that marine turtles spend limited time at the sea surface, approximately 3% to 6%, with dive times recorded from 15 to 60 minutes (Milton and Lutz 2003). A study on green turtles by Hazel (2009) found that individuals only exposed the dorsal-anterior part of the head above the water surface, and for never longer than two seconds.

Turtles can detect sound in water and will generally move from anthropogenic noise-generating sources, such as vessels, within their detection range (Popper et al. 2014). Studies have shown that the ability of turtles to respond and avoid vessels greatly depends on the speed of the vessel. In general, marine turtles are not able to avoid vessels when they are travelling faster than 4 km/h (2.2 knots) (Hazel 2009). The propagation characteristics of sound within the marine environment make it difficult for marine turtles to identify the direction of the source of vessel noise. Furthermore, individual noise from a vessel may be masked within areas of high vessel and other noise -generating activities use, which is likely to limit the ability of marine turtles to identify and avoid approaching vessels (Hazel 2009).

The extent of the area of risk of interaction with marine turtles is within the Operational Area and the risk could occur while the Drilling Program is undertaken. The consequence is assessed as Minor (1) and likelihood as highly unlikely, and the risk is of an acceptable level based on:

- The Recovery Plan for Marine Turtles in Australia (CoA 2017b) identifies vessel disturbance as a key threat but details that although the outcome can be fatal for individual turtles, boat strike (as a standalone threat) has not been shown to cause stock level declines.
- Three marine turtle species may occur within the Operational Areas, though no BIAs or habitat critical to the survival of the species were identified, and the presence of turtle species is expected to be of a transitory nature only.
- A vessel strike to a turtle is considered highly unlikely as it has not happened to date in 15 years of Beach's activities within the Otway and Bass.

- A marine mammal observer will be present on each support vessel to detect the presence of marine fauna and provide instruction to avoid collisions where feasible as per CM08: Whale Management Procedure.
- The consequence of a strike on a single animal is not predicted to affect the overall population or recovery of marine turtles.

Birds

The PMST Report for the Operational Area (Appendix E. 1) identified a number of seabird species that may be present in the Operational Area. Table 7-13 identified those species with biologically important behaviour and/or BIAs within the Operational Area and hence are more likely to be present in larger numbers and less transitory. In addition, Viola (2023) identified the following species that landed on a support vessel for the Beach Otway Drilling Campaign from March until 5 April 2022 and from 29 April until 31 May 2022:

- Australasian Pipit
- Brush bronzewing
- Galah
- Grey fantail
- Nankeen kestrel
- Rock dove
- Satin flycatcher
- Silvereye

No species were recorded as injured and all left the vessel within <24 h after arrival (Viola 2023).

Table 7-13: Birds Species with Biologically Important Behaviour and/or BIAs within the Operational Area

Receptor	Biologically Important Behaviour
Albatross	
Antipodean albatross	Foraging, feeding or related behaviour likely to occur within area
	Foraging BIA
Black-browed albatross	Foraging, feeding or related behaviour likely to occur within area
	Foraging BIA
Buller's albatross, Pacific albatross	Foraging, feeding or related behaviour likely to occur within area
	Foraging BIA
Campbell albatross, Campbell black-browed albatross	Foraging, feeding or related behaviour likely to occur within area
	Foraging BIA
Gibson's albatross	Foraging, feeding or related behaviour likely to occur within area

Receptor	Biologically Important Behaviour
Indian yellow-nosed albatross	Foraging BIA
Northern Buller's albatross	Foraging, feeding or related behaviour likely to occur within area
Northern royal albatross	Foraging, feeding or related behaviour likely to occur within area
Salvin's albatross	Foraging, feeding or related behaviour likely to occur within area
Shy albatross	Foraging, feeding or related behaviour likely to occur within area
	Foraging BIA
Southern royal albatross	Foraging, feeding or related behaviour likely to occur within area
Wandering albatross	Foraging, feeding or related behaviour likely to occur within area
	Foraging BIA
White-capped albatross	Foraging, feeding or related behaviour known to occur within area
Petrels	
Common diving-petrel	Foraging BIA
Northern giant petrel	Foraging, feeding or related behaviour likely to occur within area
Southern giant-petrel	Foraging, feeding or related behaviour likely to occur within area
White-faced storm-petrel	Foraging BIA
Shearwaters	
Flesh footed shearwater	Foraging, feeding or related behaviour likely to occur within area
Short-tailed shearwater	Foraging BIA
Wedge-tailed shearwater	Foraging BIA
Other	
Australian fairy tern	Foraging, feeding or related behaviour likely to occur within area
White-fronted tern	Foraging, feeding or related behaviour likely to occur within area
Orange-bellied parrot	Migration route likely to occur within area

Helicopter, rig and vessels within the Operational Areas have the potential to cause injury / mortality and a change in behaviour to seabirds and migratory birds, specifically species which fly through the Operational Areas, or spend extended periods of time on the water surface in high vessel traffic areas. The Wildlife Conservation Plan for Seabirds (CoA 2020a) recognises that seabirds are known to aggregate around oil and gas platforms in above average numbers due to night lighting, flaring, food concentrations and other visual cues (Wiese et al. 2001). While most interactions are harmless, some can be detrimental and may cause injury or death e.g. from collision or indirectly from depleted body reserves (Ronconi et al. 2015). Bird mortality has been documented due to collision with structures, and interactions with flaring activities (Wiese et al. 2021).

The risk of bird collision with helicopter operations is a safety consideration for flights to and from the rig. The consequence of a helicopter bird strike varies and is influenced by the individual's seasonal distribution, body mass, flocking and flight behaviour, while the probability of a strike is related to the abundances of different bird species on or near the rig.

The extent of the area of risk of interaction with birds is within the Operational Area and the risk could occur while the Drilling Program is undertaken. The consequence is assessed as Minor (1) and likelihood as possible, and the risk is of an acceptable level based on:

- The National Recovery Plan for Albatrosses and Petrels (2022) (CoA 2022a) classifies marine infrastructure interactions including those associated with artificial light as having no risk category priority and affecting 'Nil' species in Australian jurisdiction.
- The National Recovery Plan for the Orange-bellied Parrot (DELWP 2016) identified as Critically Endangered, lists illuminated structures, and illuminated boats as potential barriers to migration and movement as a main threat (See Section 7.2 for the impacts of light emissions). As detail in the assessment of light impacts (Section 7.2) a Light Management Plan (CM07) will be implemented to minimise light impacts which will also minimise the likelihood of bird species such as the Orange-bellied parrot potentially being attracted to the rig or vessel where a collision could occur. In 15 years of Beach's activities within the Otway and Bass an Orange-bellied parrot has not been reported on a vessel, rig, or platform.
- Albatross, petrels, shearwaters, and terns) were identified to have foraging BIAs or foraging behaviour likely within the Operational Areas. As detail in the assessment of light impacts (Section 7.2) a Light Management Plan (CM07) will be implemented to minimise light impacts which will also minimise the likelihood of bird species such as albatross, shearwaters, petrels, and terns potentially being attracted to the rig or vessel where a collision could occur. In 15 years of Beach's activities within the Otway and Bass an albatross, shearwater or petrel has not been reported on a vessel, rig or platform.
- The consequence of a strike on a single bird is not predicted to affect the overall population.

Marine Mammals

The Operational Area PMST Report (Appendix E. 1) 27 cetacean species that may or are likely to occur within the Operational Area and two fur-seal species that may occur within the Operational Area. Table 7-14 details marine mammals that have biologically important areas and/or biologically important behaviours within the Operational Area.

Table 7-14: Marine Mammals with Biologically Important Behaviours within the Operational Area

Species	Biologically Important Behaviour
Blue whale	Foraging, feeding or related behaviour known to occur within area.
	Otway - foraging (annual high use area) and known foraging area. Bass – foraging BIA

Fin whale	Foraging, feeding or related behaviour likely to occur within area.
	No BIAs
Pygmy right whale	Foraging, feeding or related behaviour may to occur within area.
	No BIAs
Sei whale	Foraging, feeding or related behaviour likely to occur within area.
	No BIAs
Southern right whale	Species or species habitat known to occur within area
	Migration BIA

Vessel collisions have the potential to result in injury/mortality to marine mammals, such as cetaceans and pinnipeds. Cetaceans and pinnipeds are naturally inquisitive species which are often attracted to offshore vessels, for example dolphins are commonly reported to 'bow ride'. The reaction of cetaceans to an approaching vessel is variable and unpredictable. Often species remain motionless whilst in the vicinity of a vessel, whereas others have been known to be curious, often approaching ships which have stopped or are slow moving. In general they do not approach, and sometimes actively avoid, faster moving vessels (Richardson et al. 1995). For example, humpback whales have been shown to frequently change course to avoid a vessel after detection (WDCS 2006).

Vessel collisions with cetaceans occur more frequently in areas where high vessel traffic and cetacean habitat coincide (WDCS 2006). Peel et al. (2016) analysed the number of vessel collisions with cetaceans within Australian waters, stating at least 109 vessel collisions have been reported since 1840. However, the paper emphasises a lack of reporting as an issue in confirming exact numbers. Recorded instances of cetacean deaths due to vessel strikes indicate that they are much more likely to be associated with container ships and fast ferries (WDCS 2006). When vessels are stationary or slow moving, the risk of collision with cetaceans is extremely low, as the vessel's size and underwater noise 'footprint' will alert cetaceans to its presence and thus elicit avoidance.

The extent of the area of risk of interaction with marine mammals is within the Operational Area and the risk could occur while the Drilling Program is undertaken. The consequence is assessed as Minor (1) and likelihood as highly unlikely, and the risk is of an acceptable level based on:

- Minimising vessel collision is ranked as a high priority action within the Conservation Management Plans for the blue whale and southern right whale, and within the Conservation Advice for fin and sei whales.
- The foraging BIA for the pygmy blue whale intersects with the Operational Areas. The Conservation Management Plan for the Blue Whale (CoA 2015) details that vessel collisions will impede the recovery of blue whale populations if a sufficient number of individuals in the population lose reproductive fitness or are killed. A vessel strike to a whale is considered highly unlikely as it has not happened to date in 15 years of Beach's activities within the Otway and Bass. It is further reduced by there being a marine mammal observer on each support vessel to detect the presence of marine fauna and provide instruction to avoid collisions where feasible (CM08: Whale Management Procedure).
- The Operational Areas are within a migration BIA of the southern right whale. The Conservation Management Plan for the Southern Right Whale (DSEWPaC 2012a) and the Draft National

Recovery Plan for the Southern Right Whale (DCCEEW 2022a) lists vessel strike collisions as a high-risk threat. The plan does not identify any actions relevant to the Drilling Program but does note that reducing ship strike mortality can be most easily done either by reducing vessel speed or by separating vessels and whales. As both these controls will be implemented, with the rig and vessels being either stationary or operating at slow speeds (≤ 10 knots as per CM02: Vessel and Rig Operating Procedures) and vessels when transiting maintaining a distance of 300 m from a whale (CM08: Whale Management Procedure), reducing the likelihood of a strike. A marine mammal observer will be present on each support vessel to detect the presence of marine fauna and provide instruction to avoid collisions where feasible (CM08: Whale Management Procedure).

- The Listing Advice for the Humpback Whale (DAWE 2022a) details that the species is no longer listed as Vulnerable and identifies vessel strike as a current impact not threatening or preventing population growth.
- The Recovery Plan for the Australian Sea-lion (DSEWPaC 2013c) identifies the need to investigate and mitigate other potential threats including vessel strike, to ensure that anthropogenic activities do not hinder the recovery of the species. A marine mammal observer will be present on each support vessel to detect the presence of marine fauna and provide instruction to avoid collisions where feasible (CM08: Whale Management Procedure).
- Peel et al. (2016) reviewed vessel strike data (2000-2015) for marine species in Australian waters and identified that there were no vessel interaction reports during the period for Australia sea-lions, Australian or New Zealand fur- seals. There have been incidents of seals being injured by boat propellers, however all indications are rather than 'boat strike' these can be attributed to the seal interacting/playing with a boat, with a number of experts indicating the incidence of boat strike for seals is very low.
- A vessel strike to a marine mammal is considered highly unlikely as it has not happened to date in 15 years of Beach's activities within the Otway and Bass.
- Rig and vessel movements in the Operational Areas will be low (≤ 10 knots as per CM02: Vessel and Rig Operating Procedures) which affords protection to fauna as the most severe injuries have been identified to be caused by vessels travelling faster than 14 knots (Jensen and Silber 2004, Laist et al. 2001).
- A marine mammal observer will be present on each support vessel to detect the presence of marine fauna and provide instruction to avoid collisions where feasible as per CM08: Whale Management Procedure.
- Given the expected low likelihood of vessel strike, and if it did occur it will not affect the long-term recovery of marine mammal species in accordance with relevant conservation plans and advice.

7.10.5.2 Conservation Values and Sensitivities

The northern T/30P Operational Area overlaps the West Tasmania Canyons KEF in water depths >150 m. The values associated with the West Tasmania Canyon KEF are fish associated with sponges near canyon heads described in Section 6.2.15.6. As fish are not known to be impacted by vessel collision impacts to the West Tasmania Canyons KEF are not predicted.

7.10.5.3 Cultural Values and Sensitivities

From Section 6.6.3, the following cultural values and sensitivities have been identified as potentially at risk from rig, vessel and/or helicopters movements and the section where potential risks have been assessed:

- Birds – see Section 7.10.5.1
- Marine mammals: dolphins, whales, seal - see Section 7.10.5.1

Noting that eels and fish are not identified at risk from rig or vessel movements.

A summary of the assessment for birds and marine mammals is provided below.

- A Light Management Plan (CM07) will be implemented to minimise light impacts which will also minimise the likelihood of bird species such as orange-bellied parrot, albatross, shearwaters, petrels, and terns potentially being attracted to the rig or vessel where a collision could occur. In 15 years of Beach's activities within the Otway and Bass an orange-bellied parrot, albatross, shearwater, or petrel has not been reported on a vessel, rig or platform.
- The consequence of a helicopter strike on a single bird is not predicted to affect the overall population.
- A vessel strike to marine mammals is considered highly unlikely as it has not happened to date in 15 years of Beach's activities within the Otway and Bass.
- Rig and vessel movements in the Operational Areas will be low (≤ 10 knots as per CM02: Vessel and Rig Operating Procedures) which affords protection to fauna as the most severe injuries have been identified to be caused by vessels travelling faster than 14 knots (Jensen and Silber 2004, Laist et al. 2001).
- A marine mammal observer will be present on each support vessel to detect the presence of marine fauna and provide instruction to avoid collisions where feasible as per CM08: Whale Management Procedure.
- Given the expected low likelihood of vessel strike, and if it did occur it will not affect the long-term recovery of marine mammal species in accordance with relevant conservation plans and advice.

7.10.6 Demonstration that Risks will be ALARP

ALARP decision context and justification	ALARP Decision Context: Type A The risk of fauna interaction is well understood and there is nothing new or unusual. On the basis of the impact assessment completed, Beach considers the control measures identified are appropriate to manage the risk associated with fauna interaction.
Adopted Control Measures	**Description**
CM01: Marine Assurance Process	The rig and vessels will meet relevant maritime laws and includes pre-commencement rig and vessel inspections of class certification requirements under the Navigation Act 2012 and associated Marine Orders, including but not limited to MO 30 - Prevention of Collisions

	which details the requirements for navigation equipment, watchkeeping, radar and lighting requirements. Marine Order 57: Helicopter Operations ensures the obstacles on the helideck including birds are clear before approach and landing.
CM02: Vessel and Rig Operating Procedures	Vessel speeds within the Operational Area will be restricted to ≤ 10 knots.
CM07: Light Management Plan	Beach will contract a suitably qualified specialist to develop and support the implementation of a Light Management Plan as per the National Light Pollution Guidelines for Wildlife (CoA 2023). Once safety navigational lighting requirements are met (as per vessel class), the Light Management Plan will detail additional mitigations to ensure artificial lighting is reduced to minimum levels based on the information in the Seabird Light Mitigation Toolbox (CoA 2023) wherever practicable, whilst maintaining safe working conditions and navigation. Specifically, outwards facing lighting will be reduced to minimum levels, wherever practicable.
CM08: Whale Management Procedure	The Whale Management Procedure (Appendix H) outlines specific measures to minimise anthropogenic noise threats to relevant species, including the implementation of safe operating distances between vessels and whales, pre-activity surveys for specific activities, night-time and low visibility controls and establishment of safe points for operational activities in accordance with the Safety Case and Well Integrity requirements.

7.10.7 Demonstration that Risks will be of an Acceptable Level

Consequence rating	Minor (1)
Likelihood of occurrence	Highly Unlikely (B)
Residual risk	Low
Acceptability assessment	
To meet the principles of ESD	The risk of fauna interaction was assessed as Low to Medium, and the consequence was assessed as Minor (1) which is not considered as having the potential to result in serious or irreversible environmental damage. There is high confidence in the predicted level of risk as Beach has significant experience operating in the Otway and Bass based on their existing offshore developments and associated activities including the Beach Otway Drilling Campaign in 2021/2022.
Internal context	The proposed management of the risk is aligned with the Beach Environment Policy. Activities will be undertaken in accordance with the Implementation Strategy (Section 8).
External context	There have been no stakeholder objections or claims regarding fauna interaction.
Other requirements	Fauna interactions will be managed in accordance with legislative requirements. EPBC Regulations 2000 – Part 8 Division 8.1 interacting with cetaceans requirements are implemented as per CM08: Whale Management Procedure.

	As per the impact assessment, rig, vessel, and helicopters movements will not:
	• Impact the recovery of the white shark as per the Recovery Plan for the White Shark (*Carcharodon carcharias*) (DSEWPaC 2013a).
	• Impact on the recovery of marine turtles as per the Recovery Plan for Marine Turtles in Australia (CoA 2017b).
	• Impact the long-term survival and recovery of albatross and petrel populations as per the National Recovery Plan for Albatrosses and Petrels (CoA 2022a).
	• Impact the conservation of listed seabirds as per the Wildlife Conservation Plan for Seabirds (CoA 2020a). Applicable actions associated with the plan have been addressed as per:
	  ◦ Implementing a comprehensive monitoring program of impacts of these offshore platforms should include nature, timing and extent of bird mortality caused by these structures. CM07: Light Management Plan includes recording any injury/deaths of bird species associated with the rig, vessel or helicopters and reporting is detailed in Section 8.3.1.
	• Impact the long-term survival and recovery of the orange-bellied parrot as per the National Recovery Plan for the Orange-bellied Parrot (DELWP 2016).
	• Impact the recovery of the Australian sea lion as per the Recovery Plan for the Australian Sea Lion (DSEWPaC 2013b).
	• Impact the recovery of the blue whale as per the Conservation Management Plan for the Blue Whale (CoA 2015). Actions from the Conservation Management Plan for the Blue Whale (CoA 2015) applicable to the activity to minimise vessel collisions have been addressed as per:
	  ◦ Ensure all vessel strike incidents are reported in the National Ship Strike Database. Vessel collision with protected marine fauna are required to be reported as detailed in Section 8.3.1.
	  ◦ Ensure the risk of vessel strikes on blue whales is considered when assessing actions that increase vessel traffic in areas where blue whales occur and, if required, appropriate mitigation measures are implemented. Section 7.10.5.1 details the impact assessment and mitigation measures (controls) to be implemented to ensure impacts are of an acceptable level and ALARP.
	• Impact the recovery of the southern right whale as per the Conservation Management Plan for the Southern Right Whale (DSEWPaC 2012a) and National Recovery Plan for the Southern Right Whale (DCCEEW 2022a). Actions from the draft National Recovery Plan for the Southern Right Whale (DCCEEW 2022a) applicable to the activity to minimise vessel collisions have been addressed as per:
	  ◦ Assess risk of vessel strike to southern right whales in BIAs. Section 7.10.5.1 details the impact assessment and mitigation measures (controls) to be implemented to ensure impacts are of an acceptable level and ALARP.
	  ◦ Ensure environmental impact assessments and associated plans consider and quantify the risk of vessel strike and associated potential cumulative risks in BIAs. Section 7.10.5.1 details the impact assessment and mitigation measures (controls) to be implemented to ensure impacts are of an acceptable level and

	ALARP. As detailed in the assessment vessel collision to southern right whales have not been recorded from oil and gas activities off Victoria and as only one drill rig and vessels will be present in Otway and Bass for the Drilling Program cumulative impacts are not predicted. ◦ Ensure all vessel strike incidents are reported in the National Ship Strike Database managed through the Australian Marine Mammal Centre, Australian Antarctic Division. Vessel strikes to marine fauna will be reported in the National Ship Strike Database as per Section 8.3.1 • Impact the recovery of sei or fin whales, covered by conservation advice.
Monitoring and reporting	Vessel strikes to protected marine fauna area required to be reported as detailed in Section 8.3.1.
Acceptability outcome	**Acceptable**

7.11 Loss of Materials or Waste

7.11.1 Source of Aspect

Small quantities of hazardous and non-hazardous materials are used during routine vessel and rig operations, and consequently result in waste generation which requires handling and storage on vessels and the rig. Non-hazardous materials could be accidentally dropped or blown overboard due to overfull bins, crane incidents or improper storage or handling. Hazardous waste may be accidentally dropped or lost overboard as a result of leaks, overfilling of tanks or emergency disconnection of hoses. Spill to the marine environment are covered in Section 7.12.

7.11.2 Predicted Environmental Impacts

In the event of a loss of material or waste overboard, injury/mortality to fauna could occur.

7.11.3 EMBA

Loss of material or waste overboard could occur within the Operational Areas potentially impacting:

- Sharks, seabirds, turtles, and marine mammals.

These ecological receptors are values of the following within the Operational Area:

- Conservation values and sensitivities
- Cultural values and sensitivities

7.11.4 Predicted Level of Risk

7.11.4.1 Ecological Receptors

The Threat Abatement Plan for the Impacts of Marine Debris on Vertebrate Wildlife of Australia's Coasts and Ocean (CoA 2018) details harmful marine debris impacts on a range of marine life, including protected species of birds, sharks, turtles, and marine mammals. Harmful marine debris refers to all plastics and other types of debris from domestic or international sources that may cause harm to vertebrate marine wildlife. This includes land sourced plastic garbage (e.g. bags, bottles, ropes, fibreglass, piping, insulation, paints, and adhesives), derelict fishing gear from recreational and commercial fishing activities and ship-sourced, solid non-biodegradable floating materials lost or disposed of at sea.

Solids accidently released to the marine environment may lead to injury or death to individual marine fauna through ingestion or entanglement. Impacts will be restricted in exposure and quantity and will be limited to individual fauna.

A distribution BIA for the white shark has been identified within the Operational Area. The Recovery Plan for the White Shark (DSEWPaC 2013a) does not identify waste or marine debris as a threat. White shark presence within the Operational Areas is expected to be transitory in nature.

Three marine turtle species (or species habitat) may occur within the Operational Area though no BIAs or critical habitat to the survival of the species were identified. The Recovery Plan for Marine Turtles in Australia (CoA 2017b) identified marine debris as a threat.

The Operational Area also overlaps foraging BIAs for albatross, petrel, and shearwater species. Marine debris is identified as a threat in the National Recovery Plan for Albatrosses and Petrels 2022 (CoA 2022a).

Twenty-seven cetaceans species (or species habitat) may or likely to occur within the Operational Area. Foraging behaviours were identified for some species (blue, fin, pygmy right and sei whales); no other important behaviours were identified. The Operational Area intersects foraging BIAs for the pygmy blue whale and migration BIA for the southern right whale.

The Conservation Management Plan for the blue whale (CoA 2015) and for the southern right whale (DSEWPaC 2012a) and Conservation Advice for the sei whale (TSSC 2015g) and fin whale (TSSC 2015f) do not identify marine debris as threat. The draft National Recovery Plan for the Southern Right Whale (DCCEEW 2022a) identifies marine debris as a threat, specifically vessel-sourced, solid, non-biodegradable floating materials disposed of or lost at sea. It details that ingestion of marine debris, however, is thought to be unlikely for southern right whales in Australian coastal waters given whales are less likely to be feeding. No actions from the recovery plan were identified specific to vessel debris.

The PMST Report for the Operational Area did not identify any threatened marine invertebrate species or benthic habitats.

The extent of the area of impact is adjacent to the rig or support vessels within the Operational Area. The consequence to ecological receptors is assessed as Minor (1) and likelihood as unlikely, and the risk is of an acceptable level based on:

- Rig and vessel management systems addressing dropped object, waste storage and chemical handling and storage are well practiced, well understood and will be subject to regular audit for effectiveness and compliance during the Drilling Program.
- An unplanned release of waste will be of a very low volume if an incident occurred, and impacts would be restricted to individual fauna and would not impede the recovery of a protected species.
- Where possible material lost overboard would be recovered.
- The Threat Abatement Plan for the Impacts of Marine Debris on Vertebrate Wildlife of Australia's Coasts and Ocean (CoA 2018) suggests that most marine plastic debris are associated to shipping and fishing activities (fishing gear, balloons and plastic bags).
- Waste will be handled in accordance with AMSA Discharge Standards and respective rig and vessel Garbage Management Plans. Given this, any waste lost overboard would be in minimal quantities.
- The likelihood of losing waste or other materials overboard is unlikely with the rig and vessels management systems in place. The consequence of a loss of material or waste overboard would be limited to individuals and not affect an entire population.

7.11.4.2 Socio-economic Receptors

In the event a buoyant object is accidentally released and cannot be recovered by a vessel, the buoyant object may present a navigation or entanglement hazard to commercial fishers and other

marine users. Further the buoyant object may become non-buoyant overtime and sink to the seabed, where it may present a snagging hazard on the seafloor for commercial trawling activities.

The extent of the area of impact is adjacent to the rig or support vessels within the Operational Area. The consequence to socio-economic receptors is assessed as Minor (1) and likelihood as unlikely, and the risk is of an acceptable level based on:

- Rig and vessel management systems addressing dropped object, waste storage and chemical handling and storage are well practiced and well understood.
- An unplanned release of waste will be of a very low volume if an incident occurred, and impacts would be restricted to individual marine users or individual fishers.
- Where possible material lost overboard would be recovered.
- Waste will be handled in accordance with AMSA Discharge Standards and respective rig and vessel Garbage Management Plans. Given this, any waste lost overboard would be in minimal quantities.
- The likelihood of losing waste or other materials overboard is unlikely with the rig and vessels management systems in place. The consequence of a loss of material or waste overboard would be restricted to impacts to individual marine users or individual fishers.

7.11.4.3 Cultural Values and Sensitivities

From Section 6.6.3, the following cultural values and sensitivities have been identified as potentially at risk from a loss of waste or other materials overboard and the section where potential risks have been assessed:

- Seabirds and marine mammals – see Section 7.11.4.1.

A summary of the assessment for birds and marine mammals is provided below.

- Rig and vessel management systems addressing dropped object, waste storage and chemical handling and storage are well practiced and well understood.
- An unplanned release of waste will be of a very low volume if an incident occurred, and impacts would be restricted to individual fauna and would not impede the recovery of a protected species.
- Where possible material lost overboard would be recovered.
- The Threat Abatement Plan for the Impacts of Marine Debris on Vertebrate Wildlife of Australia's Coasts and Ocean (CoA 2018) suggests that most marine plastic debris are associated to shipping and fishing activities (fishing gear, balloons and plastic bags).
- Waste will be handled in accordance with AMSA Discharge Standards and respective rig and vessel Garbage Management Plans. Given this, any waste lost overboard would be in minimal quantities.

- The likelihood of losing waste or other materials overboard is unlikely with the rig and vessels management systems in place. The consequence of a loss of material or waste overboard would be limited to individuals and not affect an entire population.

7.11.5 Demonstration that Risks will be ALARP

ALARP decision context and justification	ALARP Decision Context: Type A The risk of loss of materials or waste is well understood and there is nothing new or unusual. On the basis of the impact assessment completed, Beach considers the control measures identified are appropriate to manage the risk associated with loss of materials or waste.
Adopted Control Measures	**Description**
CM01: Marine Assurance Process	The rig and vessels will meet relevant maritime laws and includes pre-commencement rig and vessel inspections of class certification requirements under the Navigation Act 2012 and associated Marine Orders, including but not limited to: • Marine Order Part 95 (Marine pollution prevention - garbage) which gives effect to MARPOL Annex V including waste with potential to be windblown shall be stored in covered containers. • Marine Order 42 (Carriage, stowage and securing of cargoes and containers) 2016, where relevant, to ensure cargo is packed, loaded, stowed, and secured throughout each voyage.
CM02: Vessel and Rig Operating Procedures	All lifting gear used for deployment and retrieval of equipment over the rig and vessels is load rated for the working load.
	If deemed safe and effective to do so, support vessels can assist in the recovery of lost materials or waste.
	The recording and reporting of incidents, including those associated with loss of waste or materials overboard is standard in the industry. AMSA JRCC and other marine users will be notified in the event of loss of materials with potential to affect safe navigation.

7.11.6 Demonstration that Risks will be of an Acceptable Level

Consequence rating	Minor (1)
Likelihood of occurrence	Unlikely (C)
Residual risk	Low
Acceptability assessment	
To meet the principles of ESD	The risk of loss of materials or waste was assessed as Low and the consequence was assessed as Minor (1) which is not considered as having the potential to result in serious or irreversible environmental damage. There is high confidence in the predicted level of risk as Beach has significant experience operating in the Otway and Bass based on their existing offshore developments and associated activities including the Beach Otway Drilling Campaign in 2021/2022.
Internal context	The proposed management of the risk is aligned with the Beach Environment Policy.

	Activities will be undertaken in accordance with the Implementation Strategy (Section 8).
External context	There have been no stakeholder objections or claims regarding loss of materials or waste overboard.
Other requirements	Materials and waste on board the rig vessels will be managed in accordance with legislative requirements. As per the impact assessment a loss of materials or waste overboard will not As per the impact assessment, rig, vessel, and helicopters movements will not: • Impact the recovery of the white shark as per the Recovery Plan for the White Shark (*Carcharodon carcharias*) (DSEWPaC 2013a). • Impact on the recovery of marine turtles as per the Recovery Plan for Marine Turtles in Australia (CoA 2017b). • Impact the long-term survival and recovery of albatross and petrel populations as per the National Recovery Plan for Albatrosses and Petrels (CoA 2022a). • Impact the conservation of listed seabirds as per the Wildlife Conservation Plan for Seabirds (CoA 2020a). • Impact the long-term survival and recovery of the orange-bellied parrot as per the National Recovery Plan for the Orange-bellied Parrot (DELWP 2016). • Impact the recovery of the Australian sea lion as per the Recovery Plan for the Australian Sea Lion (DSEWPaC 2013b). • Impact the recovery of the blue whale as per the Conservation Management Plan for the Blue Whale (CoA 2015). • Impact the recovery of the southern right whale as per the Conservation Management Plan for the Southern Right Whale (DSEWPaC 2012a) and National Recovery Plan for the Southern Right Whale (DCCEEW 2022a). • Impact sei or fin whales, covered by Conservation Advice for Fin Whales (TSSC 2015f) and Conservation Advice for Sei Whales (TSSC 2015g).
Monitoring and reporting	Loss of materials or waste overboard is required to be reported as per Section 8.3.1.
Acceptability outcome	**Acceptable**

7.12 Loss of Containment

7.12.1 Source of Aspect

Activities associated with the Drilling Program have the potential to result in a loss of containment of hydrocarbons.

Guidance on the identification of worst-case credible spill scenarios is given in AMSA's Technical Guidelines for Preparing Contingency Plans for Marine and Coastal Facilities (AMSA 2015) and Technical Report on Calculation of Worst-Case Discharge (SPE 2016). These documents were used to identify potential hydrocarbon spill scenarios for the Drilling Program as detailed in Section 7.12.4 and Table 7-15.

Beach has assessed the potential spill risk to existing Beach infrastructure from the Drilling Program and did not identify any credible spill risk. This assessment and outcome is detailed in the Rig Safety Case.

Table 7-15: Loss of Containment Resulting in a Hydrocarbon Spill Scenarios

Scenario	Description	Worst-case release volume and rate
Loss of Containment – hazardous substances stored on drill rig and vessels	Routine operation of the drill rig and vessels includes handling, use and transfer of hydrocarbons and chemicals with the following were identified as potentially leading to a loss of containment event: • Use, handling and transfer of hydrocarbons and chemicals on board. • Hydraulic line failure from equipment.	Hydraulic line failure and use of hazardous materials onboard are associated with small volume spill events – with the maximum volume based upon the loss of an intermediate bulk container ~1 m^3.
Loss of containment – marine diesel oil (MDO)	Collision between a Beach contracted vessel and a third-party vessel.	Based on the expected vessels, the largest externally exposure fuel tank size is 350m^3.
Loss of well containment – condensate	Loss of containment as a result of well integrity failure.	The rig will only be at one well location at a time therefore the effect of the below is not cumulative. The maximum loss of well containment for representative wells in Otway Basin is: • T/30P – 7,106bbl/day (1,129.7 m^3/day) condensate. • Vic/P43 – 5,055bbl/day (803.7 m^3/day) condensate. The maximum loss of well containment for representative well in Bass Basin is: • 13,692 bbl/day (2,177 m^3/day) condensate.

7.12.2 Extent and Duration of Aspect

Drilling, Vessel operations	
Extent	Maximum extent of hydrocarbon exposure to surface, in-water and shoreline exposure thresholds is called the Planning Area, which consists of the Otway and Bass Planning Areas (Figure 6-1), and is based on a combination of diesel and condensate loss of containment scenarios.
Duration	86 days based on the time to take to drill a relief well.

7.12.3 Predicted Environmental Impacts

The known and potential environmental impacts of a hydrocarbon spill are:

- Change in water quality.

As a result of a change in water quality, further impacts may occur, which include:

- Injury / mortality to fauna.
- Change in fauna behaviour.
- Change in ecosystem dynamics.
- Changes to the conservation, socio-economic and cultural values and sensitivities.

7.12.4 Hydrocarbon Spill Modelling

Beach commissioned RPS Australia West Pty Ltd (RPS) to conduct quantitative spill modelling for a loss of diesel from a vessel collision and a loss of containment (condensate) whilst drilling. Three locations were selected as representative locations based on proximity to receptors, metocean conditions and loss of containment volume to ensure that the spill locations were representative of the potential spill scenarios, volumes, and Operational Areas where the Drilling Program will occur.

Table 7-17 details the volumes and location modelled and reasoning for the location selection. Figure 7-11 details the oil spill modelling locations.

The quantitative spill modelling assessment was undertaken for two distinct periods, defined by the unique prevailing wind and general current conditions: summer (November–April) and winter (May–October).

For the condensate loss of containment scenarios, Beach has a high degree of confidence in the estimated release rates and timing used for the modelling as they are based on known reservoir properties and flow rates. Release rates and volumes are based on a total loss of containment which assumes the failure of multiple control systems. The modelled duration of 86 days represents the time determined to implement a full dynamic well kill via the drilling of a relief well at any of the well locations.

For the MDO scenarios, the surface release represents a loss of inventory from the largest fuel tank on a support vessel due to a hypothetical vessel collision incident and aligns with the methodology recommended in the AMSA Technical guidelines for preparing contingency plans for marine and

coastal facilities (AMSA 2015). Modelling has been undertaken for a larger tank volume size (603.7 m^3) than the expected maximum tank size (350 m^3).

7.12.4.1 Hydrocarbon Characteristics

The hydrocarbon characteristics used for the quantitative spill modelling conducted by RPS are detailed in Table 7-16.

Table 7-16: Hydrocarbon Characteristics of the Hydrocarbons modelled for Otway and Bass Basins

Hydrocarbon Type	API	Density (kg/m^3)	Viscosity (cP)	Volatiles (%) (BP < 180°C)	Semi-volatiles (%) (180°C < BP < 265°C)	Low-volatiles (%) (265°C < BP < 380°C)	Persistent (%)
Otway Condensate	44.3	804.6 at 15ºC	0.87	64.0	19.0	16.0	1.0
Bass Condensate	46.7	794.1 at 15ºC	0.14	41.9	30.2	16.95	11
Marine Diesel Oil	37.6	829.1 at 25ºC	4.0	6	34.6	54.4	5

Table 7-17: Worst-case Credible Hydrocarbon Scenarios Modelled

Location	Hydrocarbon Type	Volume (m^3)	Release Duration	Reasoning	Report
Subsurface release scenarios					
T/30P (Bellerive)	Condensate	97,172 (611,192 bbl)	86 days	Furthest southern proposed well location. Largest flow rate for T/30P wells. Worse case for impacts to Tasmania and King Island.	RPS 2023a
Vic/P43 (Doris)	Condensate	69,120 (434,752 bbl)	86 days	Furthest northern proposed well location. Largest flow rate for Vic/P43 and Vic/P73 wells. Worse case for impacts to Victoria.	RPS 2023a
Bass (Bass 4)	Condensate	187,207 (1,177,496 bbl)	86 days	Largest flow rate for the Bass wells. Worse case for impacts to Tasmania. No significant difference in distance for impacts to King Island or Victoria compared to other Bass well locations.	RPS 2023b
Surface release scenarios					
T/30P (Bellerive)	Marine Diesel Oil	603.7	6 hours	Furthest southern proposed well location. Worse case for impacts to Tasmania and King Island.	RPS 2023a
Vic/P43 (Doris)	Marine Diesel Oil	603.7	6 hours	Furthest northern proposed well location. Worse case for impacts to Victoria.	RPS 2023a
Bass (Bass 4)	Marine Diesel Oil	603.7	6 hours	Worse case for impacts to Tasmania. No significant difference in distance for impacts to King Island or Victoria compared to other Bass well locations.	RPS 2023b

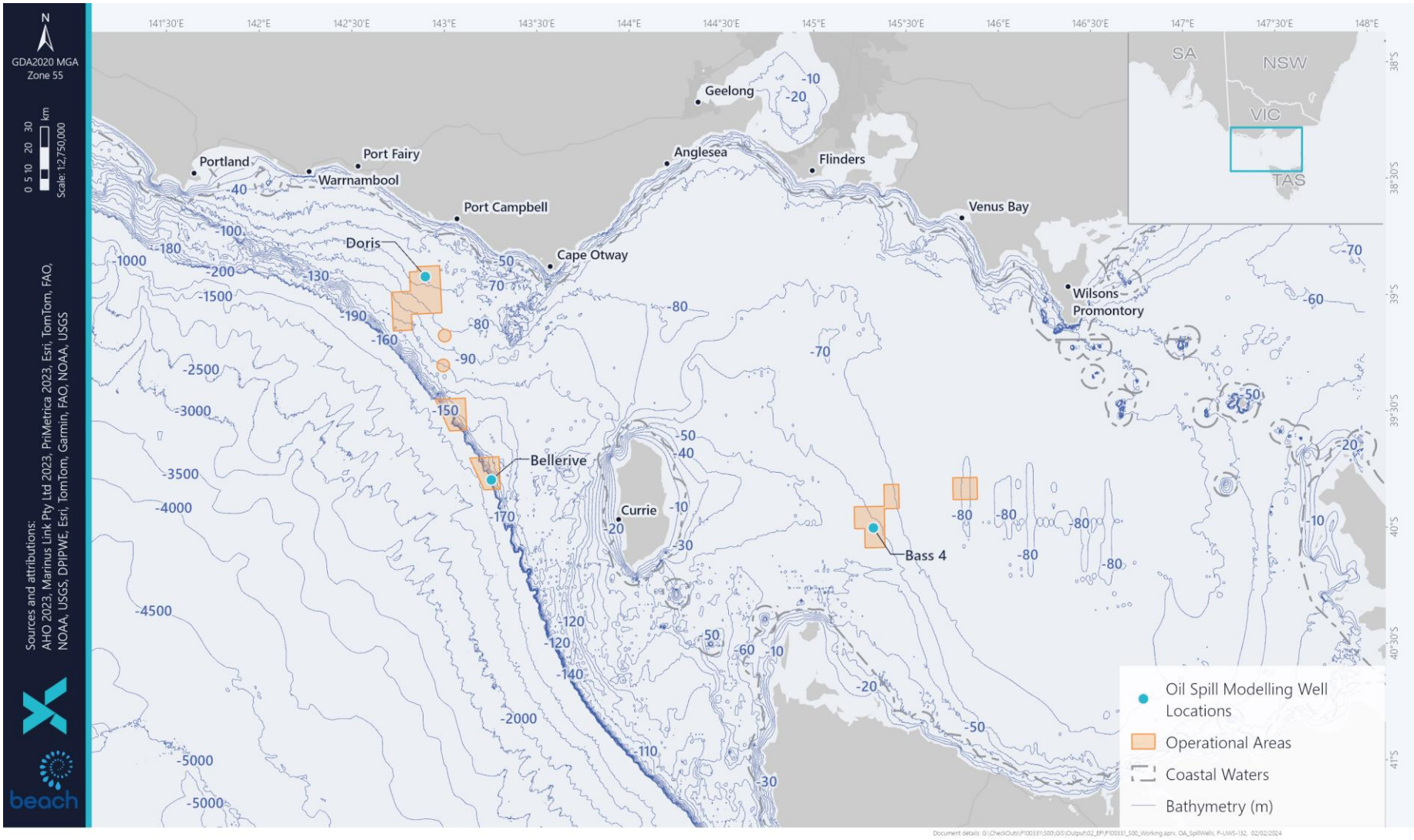


Figure 7-11: Oil Spill Modelling Locations

7.12.4.2 Hydrocarbon Exposure Thresholds

A basic foundation for meaningful oil spill modelling is the selection of appropriate oil exposure thresholds. These thresholds are used to interpret the oil spill modelling and inform the risk evaluation, spill response and oil spill monitoring.

The hydrocarbon exposure thresholds used for the spill modelling are based on the NOPSEMA Bulletin: Oil Spill Modelling (NOPSEMA 2019) and are detailed in Table 7-18. Further information on the thresholds is provided in the spill modelling reports (Appendix I).

The following thresholds have been used to:

- Predict potential hydrocarbon exposure at conservative (low exposure) concentrations to develop the Planning Area which is used to inform the description of the environment (Section 6) and oil spill monitoring plan (OSMP) (Section 8.4.3 and OSMP). Figure 6-1 details the Planning Area.
- Inform the oil spill impact and risk evaluation based on the area that may be affected (Section 7.12.5).
- Inform oil spill response planning (Section 7.13 and OPEP) based on the actionable thresholds of:
  - Surface moderate exposure (50 g/m^2).
  - Shoreline moderate exposure (100 g/m^2).

The Spill Response Planning Areas are detailed in Figure 7-12 for diesel and Figure 7-13 for condensate.

Table 7-18: Hydrocarbon Exposure Thresholds

	Threshold	Description
Surface		
Low exposure	1 g/m^2	Approximates range of socioeconomic effects and establishes planning area for scientific monitoring.
Moderate exposure	10 g/m^2	Approximates lower limit for harmful exposures to birds and marine mammals.
High exposure	50 g/m^2	Approximates surface oil slick and informs response plan.
Shoreline		
Low exposure	10 g/m^2	Predicts potential for some socio-economic impact.
Moderate exposure	100 g/m^2	Loading predicts area likely to require clean-up effort.
High exposure	1000 g/m^2	Loading predicts area likely to require intensive clean-up effort.
In water (Dissolved)		
Low exposure	10 ppb	Establishes planning area for scientific monitoring based on potential for exceedance of water quality triggers.
Moderate exposure	50 ppb	Approximates potential toxic effects, particularly sublethal effects to sensitive species.

	Threshold	Description
High exposure	400 ppb	Approximates toxic effects including lethal effects to sensitive species
In-water (Entrained)		
Low exposure	10 ppb	Establishes planning area for scientific monitoring based on potential for exceedance of water quality triggers.
High	100 ppb	As appropriate given oil characteristics for informing risk evaluation.

7.12.4.3 Extent of Hydrocarbon Exposure – Marine Diesel

Below is a summary of the quantitative spill modelling results conducted by RPS for the worst-case credible surface loss of containment release scenario for each of the three drilling locations identified for the Drilling Program. Refer to the RPS Reports in Appendix I for further details.

Otway - T/30P

- The maximum distance from the release location to the low (1–10 g/m^2), moderate (10–50 g/m^2) and high (>50 g/m^2) surface exposure zones was 57 km (south-southeast) during winter conditions, 48 km (south-southeast) during winter conditions and 8 km (south-southeast) during both seasons respectively.
- The probability of accumulation to any shoreline at, or above, the low level (10 g/m^2) threshold was 7% during summer conditions and 47% during winter conditions. The minimum time before shoreline accumulation above the low threshold was 8 days during summer conditions and 4 days during the winter conditions predicted for King Island.
- At the depths of 0-10 m, during summer and winter, the maximum dissolved aromatic concentration at any given receptor was predicted to be 187 ppb and 178 ppb, respectively.
- Outside of the receptors that the release location resides within, the maximum dissolved hydrocarbon exposure during summer and winter was 100 ppb and 105 ppb, respectively.
- At the depths of 0-10 m, during summer and winter, the maximum entrained concentration at any given receptor was predicted to be 16,927 ppb and 15,779 ppb, respectively. Outside of the receptors that the release location resides within, the maximum dissolved hydrocarbon exposure during summer and winter was 4,867 ppb and 5,489 ppb, respectively.

Otway – Vic/P43

- The maximum distance from the release location to the low (1–10 g/m^2), moderate (10–50 g/m^2) and high (>50 g/m^2) surface exposure zones was 54 km (east) during winter conditions, 19 km (south-southeast) during winter conditions and 10 km (north-northwest in summer and east in winter).
- The probability of accumulation to any shoreline at, or above, the low level (10 g/m^2) threshold was 28% during summer conditions and 26% during winter conditions. The minimum time before

shoreline accumulation above the low threshold was 4 days during summer conditions and 2 days during the winter conditions predicted for Colac Otway and Colac Otway West.

- At the depths of 0-10 m, during summer and winter, the maximum dissolved aromatic concentration at any given receptor was predicted to be 151 ppb and 156 ppb, respectively. Outside of the receptors that the release location resides within, the maximum dissolved hydrocarbon exposure during summer and winter was 45 ppb and 31 ppb, respectively.

- At the depths of 0-10 m, during summer and winter, the maximum entrained concentration at any given receptor was predicted to be 13,567 ppb and 12,277 ppb, respectively. Outside of the receptors that the release location resides within, the maximum dissolved hydrocarbon exposure during summer and winter was 801 ppb and 1,326 ppb, respectively.

Bass:

- The maximum distance from the release location to the low (1–10 g/m^2), moderate (10–50 g/m^2) and high (>50 g/m^2) surface exposure zones was 42 km (west-southwest) during winter conditions, and 25 km (west-southwest) during summer conditions and 11 km (west) during winter conditions respectively.

- The probability of accumulation to any shoreline at, or above, the low level (10 g/m^2) threshold was 11% during summer conditions and 3% during winter conditions. The minimum time before shoreline accumulation above the low threshold was 5 days predicted for Circular Head and Hunter Island (during summer) and 4 days at Hunter Island (during winter).

- At the depths of 0-10 m, during summer and winter, the maximum dissolved aromatic concentration at any given receptor was predicted to be 217 ppb and 189 ppb, respectively. Outside of the receptors that the release location resides within, the maximum dissolved hydrocarbon exposure during summer and winter was 53 ppb and 36 ppb, respectively.

- At the depths of 0-10 m, during summer and winter, the maximum entrained concentration at any given receptor was predicted to be 15,877 ppb and 117,097 ppb, respectively. Outside of the receptors that the release location resides within, the maximum dissolved hydrocarbon exposure during summer and winter was 695 ppb and 623 ppb, respectively.

7.12.4.4 Extent of Hydrocarbon Exposure – Condensate

Below is a summary of the quantitative spill modelling results conducted by RPS for the worst-case credible subsea loss of well containment scenario for each of the three drilling locations identified for the Drilling Program. Refer to the RPS Reports in Appendix I for further details.

Otway - T/30P

- The maximum distance from the release location to the low (1–10 g/m^2), moderate (10–50 g/m^2) and high (>50 g/m^2) surface exposure zones was 79 km (east-southeast) during winter conditions, 20 km (southeast) during summer conditions and 1 km (west-southwest) during summer and winter conditions, respectively.

- The probability of accumulation to any shoreline at, or above, the low level (10 g/m^2) threshold was 89% during summer conditions and 100% during winter conditions. The highest probability

of shoreline accumulation for the moderate level 100 g/m^2 was predicted King Island (37% during summer and 91% during winter).

- At the depths of 0-10 m, during summer and winter, the maximum dissolved aromatic concentration at any given receptor, including the receptors outside where the release location resides in, was predicted to be 1,904 ppb and 1,665 ppb, respectively.

- At the depths of 0-10 m, during summer and winter, the maximum entrained concentration at any given receptor was predicted to be 4,558 ppb and 5,104 ppb, respectively. Outside of the receptors that the release location resides within, the maximum dissolved hydrocarbon exposure during summer and winter was 1,454 ppb and 1,464 ppb, respectively.

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- The maximum distance from the release location to the low (1–10 g/m^2) and moderate (10–50 g/m^2) surface exposure zones was 53 km (east) during summer conditions and 12 km (south-southeast) during winter conditions, respectively. For the high threshold (> 50 g/m^2), the maximum distance from the release location was 1 km southeast (summer) and northwest (winter).

- The probability of accumulation to any shoreline at, or above, the low level (10 g/m^2) threshold was 100% during summer conditions and 98% during winter conditions. The highest probability of shoreline accumulation for the moderate level 100 g/m^2 was predicted Colac Otway (72% during summer and 54%), and the largest shoreline accumulation was 96 m^3 and 94 m^3, respectively.

- At the depths of 0-10 m, during summer and winter, the maximum dissolved aromatic concentration at any given receptor was predicted to be 1,796 ppb and 1,709 ppb, respectively. Outside of the receptors that the release location resides within, the maximum dissolved hydrocarbon exposure during summer and winter was 1,396 ppb and 1,410 ppb, respectively.

- At the depths of 0-10 m, during summer and winter, the maximum entrained concentration at any given receptor was predicted to be 4,243 ppb and 4,004 ppb, respectively. Outside of the receptors that the release location resides within, the maximum dissolved hydrocarbon exposure during summer and winter was 378 ppb and 332 ppb, respectively.

Bass

- The maximum distance from the release location to the low (1–10 g/m^2), moderate (10–50 g/m^2) and high (>50 g/m^2) surface exposure zones was 307 km (south), 88 km (southwest) and 17 km (north-northwest) all during winter conditions, respectively.

- The probability of accumulation to any shoreline at, or above, the low level (10 g/m^2) threshold was 89% during summer conditions and 85% during winter conditions. The highest probability of shoreline accumulation for the moderate level 100 g/m^2 was predicted at Hunter Island (1% during summer and 2%).

- At the depths of 0-10 m, during summer and winter, the maximum dissolved aromatic concentration at any given receptor was predicted to be 2,636 ppb and 2,279 ppb, respectively.

Outside of the receptors that the release location resides within, the maximum dissolved hydrocarbon exposure during summer and winter was 1,392 ppb and 1,157 ppb, respectively.

- At the depths of 0-10 m, during summer and winter, the maximum entrained concentration at any given receptor was predicted to be 22,471 ppb and 25,575 ppb, respectively. Outside of the receptors that the release location resides within, the maximum dissolved hydrocarbon exposure during summer and winter was 1,758 ppb and 1,360 ppb, respectively.

7.12.5 Predicted Level of Risk

The potential environmental impacts to receptors from hydrocarbon exposure from a loss of containment of condensate and marine diesel are discussed in the following sections.

7.12.5.1 Benthic Habitats

Macroalgae

Macroalgae			
Predicted Hydrocarbon Exposure	✘ **Surface**	✓ **In-water**	✘ **Shoreline**
Relevant Exposure Thresholds	**Moderate Exposure Thresholds (Dissolved)** **High Exposure Thresholds (Entrained)**		
Condensate	**MDO**		
Macroalgae communities may be present within the area exposed to in-water hydrocarbons at moderate (dissolved) and high (entrained) thresholds following a LOWC of condensate. The worst-case scenario modelled predicted exposure to nearshore areas at moderate (50 ppb) thresholds of dissolved, with some sites predicted to be exposed to high thresholds of both dissolved (400 ppb) and entrained (100 ppb) (RPS 2023). The modelling predicted moderate exposure thresholds for dissolved (50 ppb) and high exposure thresholds for entrained (100 ppb) in-water hydrocarbons for both Victorian and Tasmanian state waters for the worst-case scenario modelled (RPS 2023). Therefore, macroalgae communities, such as the *Durvillaea potatorum* communities found within the shallow waters of King Island and along Victorian Otway coastline (see Section 6.4.1.5) may be impacted. The shallow waters of King Island and Albatross Island were the only nearshore areas predicted to be exposed to high exposure levels of dissolved and entrained in-water hydrocarbons for the worst-case scenario modelled (RPS 2023).	Macroalgae communities may be present within the area exposed to in-water hydrocarbons at moderate (dissolved) and high (entrained) thresholds following a vessel LOC of MDO. The modelling predicted exposure to some nearshore areas at high thresholds of entrained (100 ppb) hydrocarbons. No nearshore areas were predicted to be impacted by moderate (50 ppb) or high (400 ppb) thresholds of dissolved hydrocarbons (RPS 2023). The nearshore waters of Tasmania and Victoria were identified to be exposed to thresholds of entrained hydrocarbons at the high threshold (100 ppb), however, at relatively low probabilities (2% and 7%, respectively). The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS 2023) thus the impact assessment is based on the larger condensate area of exposure.		
Predicted Environmental Impact			
In-water			
In-water exposure (entrained and dissolved) at the relevant exposure thresholds is only predicted to occur within the upper 0 – 10 m of the water column; therefore, benthic habitats, such as macroalgae, only have the potential to be exposed within intertidal or shallow nearshore waters. Intertidal macroalgal beds are more prone to oil spills than subtidal beds because, although the mucous coating of the macroalgae prevents oil adherence, oil that is trapped in the upper canopy may be more persistent, which impacts site-attached species. Additionally, when oil sticks to dry fronds on the shore, they can become heavy and break as a result of wave action (IPIECA 2002).			

Macroalgae
The physical effects of smothering, fouling and asphyxiation has been documented from oil contamination in marine plants (Blumer 1971, Cintron et al. 1981). In macroalgae, oil can act as a physical barrier for the diffusion of CO_2 across cell walls (O'Brien and Dixon 1976). The effect of hydrocarbons, however, is largely dependent on the degree of direct exposure and how much of the hydrocarbon adheres to algae, which will vary depending on the oils physical state and relative 'stickiness'. The morphological features of macroalgae, such as the presence of a mucilage layer or the presence of fine 'hairs' will influence the amount of hydrocarbon that will adhere to the algae. A review of field studies conducted after spill events by Connell et al. (1981) indicated a high degree of variability in the level of impact, but in all instances, the algae appeared to be able to recover rapidly from even very heavy oiling. The rapid recovery of algae was attributed to the fact that for most algae, new growth is produced from near the base of the plant while the distal parts (which would be exposed to the oil contamination) are continually lost. Other studies have indicated that kelp beds oiled by crude oil had a 90% recovery within 3-4 years of impact, however full recovery to pre-spill diversity may not occur for long periods after the spill (French- McCay 2004). The toxicity of hydrocarbons to macroalgae varies for the different macroalgal life stages, with water-soluble hydrocarbons more toxic (Van Overbeek and Blondeau 1954, Kauss et al. 1973; cited in O'Brien and Dixon 1976). Toxic effect concentrations for hydrocarbons and algae have varied greatly among species and studies, ranging 0.002–10,000 ppm (Lewis and Pryor 2013). The sensitivity of gametes, larva and zygote stages, however, have all proven more responsive to oil exposure than adult growth stages (Thursby and Steele 2004; Lewis and Pryor 2013). Experiments verified the susceptibility of *Nereocystis luetkeana* (bull kelp – north America) tissue to the direct exposure to several petroleum types. Antrim et al (1995) showed that petroleum treatments resulted in visible tissue damage, with a distinct bleached line being the most visible indication of plant contact with the petroleum. Moderate to heavy colour loss, which was generally followed by rapid decay of tissue, was most pronounced in 24 h exposures to unweathered and weathered diesel. The study did not look at how this would affect the productivity of bull kelp. Entrained hydrocarbon within the water column can also affect light qualities and the ability of macrophytes, including seagrasses and macroalgae, to photosynthesise.
Predicted Level of Impact
Based on the extent and duration of potential exposure, predicted level of impact is based on the condensate LOWC scenarios. The potential impacts detailed above are typically based on oils of a heavier nature than condensate and diesel that are less likely to smother or adhere to macroalgae. In addition the maximum residency time for exposure in Victorian or Tasmanian waters, where macroalgae are present is < 1 day for dissolved hydrocarbons at the moderate and above exposure threshold and up to 4 days for entrained hydrocarbons at the high threshold State waters. Given the restricted range of exposure (shallow nearshore and intertidal waters only), the predicted presence of hydrocarbons at relevant exposure thresholds expected to be in these waters, the anticipated weathering on the condensate (modelling predicted between approximately 70-82% of the volume to evaporate and between 0-22% to entrain within the first 24 hours, depending on the wind conditions (RPS 2023), any impact to macroalgae is not expected to result in long-term or irreversible damage. Consequently, the potential consequence to macroalgae from hydrocarbon exposure at relevant thresholds is considered to be **Moderate (2)** as they could be expected to result in minor, short-term damage not affecting ecosystem function.

Seagrass

Seagrass			
Predicted Hydrocarbon Exposure	✘ **Surface**	✓ **In-water**	✘ **Shoreline**
Relevant Exposure Thresholds	**Moderate Exposure Thresholds (Dissolved)** **High Exposure Thresholds (Entrained)**		
Condensate	**MDO**		
Seagrass meadows may be present within the area exposed to in-water hydrocarbons at moderate (dissolved) and high (entrained) thresholds following a LOWC of condensate. The worst-case scenario modelled predicted exposure to nearshore areas at moderate (50 ppb) thresholds of dissolved, with some sites predicted to be exposed to high thresholds of both dissolved (400 ppb) and entrained (100 ppb) (RPS 2023). The modelling predicted at, or above, moderate exposure thresholds for dissolved and high exposure thresholds for entrained in-water hydrocarbons for both Victorian and Tasmanian state waters for the worst-case scenario modelled (RPS 2023). Therefore, known seagrass meadows, such as those identified at Corner Inlet, Port Phillip Bay and Western Port Bay along the Victorian bay may be exposed. There are less known seagrass communities identified for Tasmanian coastlines (see Section 6.4.1.4).	Seagrass meadows may be present within the area exposed to in-water hydrocarbons at moderate (dissolved) and high (entrained) thresholds following a LOC of MDO. The worst-case scenario modelled predicted exposure to some nearshore areas at high thresholds of entrained (100 ppb) hydrocarbons. No nearshore areas were predicted to be impacted by moderate (50 ppb) or high (400 ppb) thresholds of dissolved hydrocarbons (RPS 2023). Both the nearshore waters of Tasmania and Victoria were identified to be exposed to thresholds of entrained (100 ppb) hydrocarbons, however, at relatively low probabilities (2% and 7%, respectively). The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS 2023).		
Predicted Environmental Impact			
In-water			
In-water exposure (dissolved or entrained) at the relevant exposure thresholds is only predicted to occur within the upper 0–10 m of the water column; therefore, benthic habitat, such as seagrass, only have the potential to be exposure within intertidal or shallow nearshore waters. Intertidal and subtidal seagrass ecosystems can be damaged in a number of ways. Direct mortality from smothering can occur, however, sub-lethal impacts from smothering are more likely to occur than lethal impacts because much of seagrasses' biomass is underground in their rhizomes and less likely to be exposed to hydrocarbons (Zieman et al. 1984). However, exposure also can take place via uptake of hydrocarbons through plant membranes and seeds may be affected by contact with oil contained within sediments (NRDA 2012). Petroleum fractions absorbed into the seagrass tissues, can also lower the organism's tolerance to other stressors and reduce growth rates (Zieman et al. 1984) (Runcie et al. 2010). Studies of offshore benthic seaweeds in the northwest Gulf of Mexico prior to and after the Macondo well blowout at Sackett and Ewing banks (in water depths of 55–75 m) found a dramatic die-off of seaweeds after the spill (60 species pre-spill compared with 10 species post-spill) (Felder et al. 2014). However, these banks are exposed to			

Seagrass
influences from Mississippi River discharges that vary year to year, so definitive links to the oil spill were not possible. Petroleum residues were observed on Ewing Bank and it is possible that this may have caused localised mortalities. Entrained hydrocarbon within the water column can affect light qualities and the ability of macrophytes, including seagrasses and macroalgae, to photosynthesise.
Predicted Level of Impact
Based on the extent and duration of potential exposure, predicted level of impact is based on the condensate LOWC scenarios. Given the restricted range of exposure (shallow nearshore and intertidal waters only), the predicted presence of hydrocarbons at relevant exposure thresholds expected to be in these waters, the anticipated weathering on the condensate (modelling predicted between approximately 70-82% of the volume to evaporate and between 0-22% to entrain within the first 24 hours, depending on the wind conditions (RPS 2023)), any impact to seagrass is not expected to result in long-term or irreversible damage. Consequently, the potential consequence to seagrass is considered to be **Minor (1)**, as they could be expected to result in localised low-level impacts.

Soft Corals

Soft Corals			
Predicted Hydrocarbon Exposure		✘ **Surface** ✓ **In-water** ✘ **Shoreline**	
Relevant Exposure Thresholds		**Moderate Exposure Thresholds (Dissolved)** **High Exposure Thresholds (Entrained)**	
Condensate		**MDO**	
Soft corals may be present within the area exposed to in-water hydrocarbons at relevant exposure thresholds following a LOWC of condensate. The worst-case scenario modelled predicted exposure at moderate (50 ppb) thresholds of dissolved, and high thresholds of both dissolved (400 ppb) and entrained (100 ppb) (RPS 2023). Corals are not identified as a dominant habitat type within the area predicted to be exposed to hydrocarbons at relevant exposure thresholds; their presence has been recorded in isolated areas such as Wilsons Promontory National Park and Cape Otway. Soft corals are typically present in deeper waters throughout the continental shelf, slope and off-slope regions, to well below the limit of light penetration (see Section 6.4.1.6). In-water exposure (dissolved or entrained) at relevant exposure thresholds is only predicted to occur within the upper 0–10 m of the water column, therefore, soft corals found in water depths below 10m are not anticipated to be impacted by in-water hydrocarbon exposure.		Soft corals may be present within the area exposed to in-water hydrocarbons at relevant exposure thresholds following a vessel LOC of MDO. The worst-case scenario modelled predicted exposure at moderate (50 ppb) thresholds of dissolved, and high thresholds of both dissolved (400 ppb) and entrained (100 ppb) (RPS 2023). The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS 2023).	
Predicted Environmental Impact			
In-water			
Exposure of entrained hydrocarbons to shallow subtidal corals has the potential to result in lethal or sublethal toxic effects, resulting in acute impacts or death at moderate to high exposure thresholds (Shigenaka 2001). Contact with corals may lead to reduced growth rates, tissue decomposition, and poor resistance and mortality of sections of reef (NOAA 2010).			
Predicted Level of Impact			
Based on the extent and duration of potential exposure, predicted level of impact is based on the condensate LOWC scenarios. Given the lack of coral reef formations, and the sporadic cover of hard or soft corals in mixed nearshore reef communities along the Victorian and Tasmanian coast, any impacts that may occur are anticipated to be limited to isolated corals. Consequently, the potential consequence to soft corals are considered to be **Minor (1)**, as they could be expected to result in localised low-level impacts.			

Mangroves

Mangroves		
Predicted Hydrocarbon Exposure	✓ **Surface** ✓ **In-water** ✓ **Shoreline**	
Relevant Exposure Thresholds	**Surface: Moderate Exposure Threshold** **In-water: Moderate Exposure Threshold (Dissolved) and High Exposure Threshold (Entrained)** **Shoreline: Moderate Exposure Threshold**	
Condensate	**MDO**	
Mangroves are not a dominant habitat found within the area potentially exposed to hydrocarbons at relevant exposure thresholds. The mangroves found within this south-east region are the most southerly extent of mangroves found in the world. The mangroves within Victoria are located mostly along sheltered sections of the coast within inlets or bays, such as Western Port and Corner Inlet. Tasmania has a few scattered strands of mangroves, predominantly located in nature reserves, such as the Lavinia Nature Reserve on the East coast of King Island. A patchy distribution of mangroves are found in estuaries and inlets along the NSW coastline (see Section 6.4.2). The modelling predicted at, or above, moderate exposure thresholds for dissolved (50 ppb) and high exposure thresholds for entrained (100 ppb) in-water hydrocarbons for both Victorian and Tasmanian state waters for the worst-case scenario modelled (RPS 2023). No hydrocarbon exposure was identified for NSW at relevant thresholds.	The modelling predicted at, or above, moderate exposure thresholds for dissolved and high exposure thresholds for entrained in-water hydrocarbons for both Victorian and Tasmanian state waters for the worst-case scenario modelled (RPS 2023). The worst-case scenario modelled predicted exposure to some nearshore areas at high thresholds of entrained (100 ppb) hydrocarbons. No nearshore areas were predicted to be impacted by moderate (50 ppb) or high (400 ppb) thresholds of dissolved hydrocarbons (RPS 2023). Both the nearshore waters of Tasmania and Victoria were identified to be exposed to thresholds of entrained (100 ppb) hydrocarbons, however, at relatively low probabilities (2% and 7%, respectively). No hydrocarbon exposure was identified for NSW at relevant thresholds. The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS 2023).	
Predicted Environmental Impact		
Surface	**In-water**	**Shoreline**
Mangroves are considered to have a high sensitivity to hydrocarbon exposure. Mangroves can be killed by heavy or viscous oil, or emulsification, that covers the trees' breathing pores thereby asphyxiating the subsurface roots, which depend on the pores for oxygen. Mangroves can also take up in-water hydrocarbons from contact with leaves, roots or sediments, and it is suspected that this uptake causes	The change in toxicity levels within the marine environment can penetrate the root surfaces, via the respiratory capabilities of the roots, poisoning the plant. Acute impacts to mangroves can be observed within weeks of exposure, whereas chronic impacts may day months to years to detect.	Hydrocarbon can enter mangrove forests when the tide is high and be deposited on the aerial roots and sediment surface as the tide recedes. This process commonly leads to a patchy distribution of the oil and its effects because different places within the forests are at different tidal heights (IPIECA 1993, NOAA 2014). The physical smothering of aerial roots by standard hydrocarbons can block the trees' breathing pores used

Mangroves	
defoliation through leaf damage and tree death (Wardrop et al. 1987).	for oxygen intake and result in the asphyxiation of sub-surface roots (International Petroleum Industry Environmental Conservation Association (IPIECA 1993).

Predicted Level of Impact

Based on the extent and duration of potential exposure, predicted level of impact is based on the condensate LOWC scenarios.

There are only a few isolated mangroves communities that may be exposed to hydrocarbons. Given the non-persistent nature of the hydrocarbon there is expected to be minimal impact from smothering of aerial roots or seedlings. However, if the residual oil does melt, some impact to the root systems and seedlings may occur.

Consequently, the potential consequences to mangroves exposed to hydrocarbons is considered to be **Moderate (2)**, as they could be expected to result in minor, short-term damage not affecting ecosystem function.

Saltmarsh

Saltmarsh			
Predicted Hydrocarbon Exposure	✘ **Surface**	✓ **In-water**	✘ **Shoreline**
Relevant Hydrocarbon Exposure	**Moderate Exposure Thresholds (Dissolved)** **High Exposure Thresholds (Entrained)**		
Condensate	**MDO**		
Communities of saltmarsh are predicted to be within the area potentially exposed to hydrocarbons at relevant exposure thresholds following a LOWC of condensate, such as estuaries and inlet/riverine systems along the Victorian and Tasmania coastline. The modelling predicted the highest probability of shoreline accumulation at, or above, the moderate (100 g/m^2) threshold to occur at King Island (81%), followed by Colac Otway (37%), with the minimum time for shoreline contact predicted as 9 days (King Island) and 7 days (Colac Otway), with a peak volume ashore of 188 m^3 and 96 m^3 respectively, (RPS 2023). Areas where saltmarsh is most extensive, such as western Port Phillip Bay (see Section 6.4.3), were only identified to be contacted by low (10 g/m^2) threshold exposure of shoreline accumulation.	Communities of saltmarsh may be present with the area potentially exposed to hydrocarbons at relevant exposure thresholds following a vessel LOC of MDO. The modelling predicted the highest probability of shoreline accumulation at, or above, the moderate (100 g/m^2) threshold to occur at King Island (13%), followed by Colac Otway (6%), with the minimum time for shoreline contact predicted as 7 days (King Island) and 4 days (Colac Otway), with a peak volume ashore of 29 m^3 and 35 m^3 respectively, (RPS 2023). Areas where saltmarsh is most extensive, such as western Port Phillip Bay (see Section 6.4.3), were not identified to be contacted by low any threshold exposure of shoreline accumulation. The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS 2023).		
Predicted Environmental Impact			
Shoreline			
Saltmarsh is considered to have a high sensitivity to hydrocarbon exposure. Hydrocarbon (in liquid form) will readily adhere to the marshes, coating the stems from tidal height to sediment surface. However, heavy oil coating is unlikely due to the highly volatile nature of the condensate hydrocarbon. Oil can enter saltmarsh systems during the tidal cycles if the estuary/inlet is open to the ocean. Saltmarsh vegetation offers a large surface area for oil absorption and tends to trap oil. Similar to mangroves, this can lead to a patchy distribution of the oil and its effects, because different places within the inlets are at different tidal heights. Evidence from case histories and experiments shows that the damage resulting from oiling, and recovery times of oiled marsh vegetation, are highly variable. In areas of light to moderate oiling where oil is mainly on perennial vegetation with little penetration of sediment, the shoots of the plants may be killed but recovery can be relatively rapid, occurring the following growing season or earlier. However, when oil penetrates the soil and the initial mortality of the vegetation is extensive, recovery to reference conditions may take 3–4 years (Hester and Mendelssohn 2000).			

Saltmarsh
Predicted Level of Impact
Saltmarshes are considered to be highly sensitive to hydrocarbon exposure. Consequently, the potential consequences to saltmarsh exposed to hydrocarbons is considered to be **Moderate (2)**, as they could be expected to be result in minor, short-term damage not affecting ecosystem function.

7.12.5.2 Marine Fauna

Plankton

Plankton		
Predicted Hydrocarbon Exposure	✓ **Surface** ✓ **In-water** ✗ **Shoreline**	
Relevant Exposure Thresholds	**Surface: Moderate Exposure Thresholds** **In-water: Moderate (dissolved) and High (entrained) Exposure Thresholds**	
Condensate	**MDO**	
Plankton (phytoplankton and zooplankton) are found in nearshore and open waters beneath the surface and form the basis for the marine food web. These organisms migrate vertically through the water column to feed in surface waters at night and, when doing so, may be exposed to surface hydrocarbons, however, to a greater extent, hydrocarbons dissolved or entrained in the water column (NRDA 2012). Plankton species are known to be sensitive to the toxic effects of oil at relatively low concentrations and large numbers of planktonic organisms may be affected in the event of a spill event (ITOPF 2014). Plankton risk exposure through ingestion, inhalation and dermal contact. Plankton are likely to be present within the area exposed to in-water hydrocarbons (at relevant exposure thresholds) within the upper 0–10 m of the water column and the surface hydrocarbons (at relevant exposure thresholds) following a LOWC of condensate. The modelling predicted a maximum distance of 88 km for surface hydrocarbons at, or above, the moderate threshold for the worst-case scenario (RPS 2023). However, it is acknowledged that effects will be greatest in the area close to the spill source where hydrocarbon concentrations are likely to be highest.	Plankton are likely to be present within the area exposed to in-water hydrocarbons (at relevant exposure thresholds) within the upper 0 – 10 m of the water column and the surface hydrocarbons (at relevant exposure thresholds) following a vessel LOC of MDO. The modelling predicted a maximum distance of 57 km for surface hydrocarbons at, or above, the moderate threshold for the worst-case scenario (RPS 2023). The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS 2023).	
Predicted Environmental Impact		
Surface	**In-water**	
Phytoplankton (photosynthetic organisms) can accumulate rapidly, due to their small size and high surface area to volume ratio, therefore populations are typically not sensitive to the impacts of oil (Hook et al. 2016). However, if phytoplankton are exposed to hydrocarbons at the sea surface, their ability to photosynthesise via smothering may	Zooplankton (protozoans and animals), such as rotifers, copepods and krill, are vulnerable to hydrocarbons due to their small size and high surface area to volume ratio. Some zooplankton also have high lipid content, which facilitates hydrocarbon uptake and bioaccumulation (Hook et al. 2016). Water column organisms that come	

Plankton	
be directly affected and would have implications for the next trophic level in the food chain (e.g., small fish) (Hook et al. 2016). In addition, the presence of surface hydrocarbons may result in a reduction of light penetrating the water column, which may again affect the rate of photosynthesis, particularly in instances where there is prolonged presence of surface hydrocarbons over an extensive area. A reduction in the rate of photosynthesis may inhibit growth, depending on the concentration range. For example, photosynthesis is stimulated by low concentrations of oil in the water column (10-30 ppb) but becomes progressively inhibited above 50 ppb. Conversely, photosynthesis can be stimulated below 100 ppb for exposure to weathered oil (Volkman et al. 1994).	into contact with oil risk exposure through ingestion, inhalation and dermal contact (NRDA 2012), which can cause immediate mortality or declines in egg production and hatching rates along with a decline in swimming speeds (Hook et al. 2016). In general, the distribution of zooplankton is closely linked to spatial and temporal patterns in primary production by phytoplankton, which in turn is closely linked to the supply of nutrients and oceanographic processes (Fathom Pacific 2023). Variations in the temporal scale of oceanographic processes therefore are expected to have a greater influence on plankton communities than the direct effect of spilled hydrocarbons. This is because reproduction by survivors or migration from unaffected areas is likely to rapidly replenish any losses from permanent zooplankton (Volkman et al. 1994). Furthermore, the proximity of nutrient-rich seasonal upwelling events which occur within the vicinity will further assist recovery rates. Studies have shown minimal or transient effects on marine plankton (Volkman et al. 1994). Once background water quality conditions have re-established, the plankton community may take weeks to months to recover due to short generation times (ITOPF 2011a), allowing for seasonal influences on the assemblage characteristics.
Predicted Level of Impact	
Phytoplankton may be impacted by limited photosynthetic (growth) capacity as a result of direct smothering or limited ability for light to penetrate the water column. While zooplankton may be impacted by toxicity through direct contact (ingestion, inhalation and dermal contact) resulting in injury or mortality. Plankton exhibit rapid recovery due to mass spawning behaviours of many species with planktonic life phase, along with ocean current facilitating migration from unaffected areas. It is expected that plankton communities will recovery over weeks to months once background water quality conditions have re-established. The magnitude of potential risk associated with a spill is considered to result in short-term and localised impacts, representing a small portion of the plankton population that is widely representative of the region, with no population level impact or impact to dependent species expected. Consequently, given the limited area exposed by moderate levels of dissolved hydrocarbons, the potential consequence to plankton are considered to be **Minor (1)**, as they could be expected to result in localised low-level, short-term, and recoverable impacts.	

Marine Invertebrates

Marine Invertebrates			
Predicted Hydrocarbon Exposure	✘ **Surface**	✓ **In-water**	✘ **Shoreline**
Relevant Exposure Thresholds	**Moderate Exposure Thresholds (Dissolved)** **High Exposure Thresholds (Entrained)**		
Condensate	**MDO**		
Marine invertebrates, located in shallow nearshore or intertidal waters where diversity and abundance are highest may be impacted moderate exposure of dissolved (50 ppb) and high exposure of entrained (100 ppb) hydrocarbons predicted to occur within the upper 0 – 10 m of the water column. Benthic invertebrates, including commercially and culturally important species such as squid, crustaceans (rock lobster, crabs) and molluscs (scallops) may be exposed to hydrocarbon at relevant exposure thresholds within the vicinity of a subsea release before the subsea plume rises. Exposure to these benthic species are less likely to occur as predicted in-water exposure (dissolved and entrained) of hydrocarbons at relevant exposure thresholds is only predicted to occur within the upper 0-10 m of the water column. For the worst-case scenario modelled, exposure to nearshore areas, where culturally important species such abalone, bimbalas, mussels, oysters and pipis may be present, was predicted at moderate (50 ppb) thresholds of dissolved, with some sites predicted to be exposed to high thresholds of both dissolved (400 ppb) and entrained (100 ppb) (RPS 2023). The shallow waters of King Island and Albatross Island were the only nearshore areas predicted to be exposed to high exposure levels of dissolved and entrained in-water hydrocarbons for the worst-case scenario modelled (RPS 2023). The modelling predicted high thresholds of dissolved and entrained to occur within Tasmanian state waters, however, only low thresholds levels for dissolved and entrained hydrocarbons were predicted for Victorian state waters (RPS 2023).	Marine invertebrates, located in shallow nearshore or intertidal waters where diversity and abundance are highest may be impacted moderate exposure of dissolved (50 ppb) and high exposure of entrained (100 ppb) hydrocarbons predicted to occur within the upper 0 – 10 m of the water column. The worst-case scenario modelled predicted exposure to some nearshore areas at high thresholds of entrained (100 ppb) hydrocarbons. No nearshore areas were predicted to be impacted by moderate (50 ppb) or high (400 ppb) thresholds of dissolved hydrocarbons (RPS 2023). Both the nearshore waters of Tasmania and Victoria were identified to be exposed to thresholds of entrained (100 ppb) hydrocarbons, however, at relatively low probabilities (2% and 7%, respectively). The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS 2023).		
Predicted Environmental Impact			
In-water			

Marine Invertebrates
The primary modes of exposure for marine invertebrate communities include: • Direct exposure to dispersed oil (e.g., physical smothering) from a subsea release of hydrocarbon which remains at the sea floor, • Direct exposure to dispersed and non-dispersed oil (e.g., physical smothering) where oil sinks down from higher depths of the ocean, • Direct exposure to dispersed and non-dispersed oil dissolved in sea water and/or partitioned onto sediment particles, • Indirect exposure to dispersed and non-dispersed oil through the food web (e.g., uptake of oiled plankton, detritus, prey, etc.) (NRDA 2012), and • Acute or chronic exposure through surface contact and/or ingestion can result in toxicological risks. Entrained and dissolved hydrocarbons can have negative impacts on marine invertebrates and associated larval forms. Impacts to some adult species (e.g. crustaceans) is reduced as a result of the presence of an exoskeleton, while others with no exoskeleton and larval forms may be more prone to impacts. Exposure to microscopic oil droplets may also impact aquatic biota either mechanically (especially filter feeders) or act as a conduit for exposure to semi-soluble hydrocarbons (that might be taken up by the gills or digestive tract) (French-McCay 2009). Toxicity is primarily attributed to water soluble polycyclic aromatic hydrocarbons (PAHs), specifically the substituted naphthalene (C2 and C3) as the higher C-ring compounds become insoluble and are not bioavailable. ANZECC (2000) identifies the following 96-hr LC50 concentrations (concentrations that kill 50% of test animals during a 96-hour observation period) for naphthalene (a key PAH dissolved phase toxicant in crude oils): • For the bivalve mollusc, *Katelysia opima*, a concentration of 57,000 ppb. • For six species of marine crustaceans, a concentration between 850 and 5,700 ppb. If invertebrates are contaminated by hydrocarbons, tissue taint can remain for several months, although taint may eventually be lost. For example, it has been demonstrated that it took 2-5 months for lobsters to lose their taint when exposed to a light hydrocarbon (NOAA 2002). Studies of offshore benthic decapod assemblages (crabs, lobsters, prawns) associated with the seaweeds and benthic substrate in the northwest Gulf of Mexico prior to and after the Macondo well blowout at Sackett and Ewing banks (in water depths of 55–75 m) showed a strong decline in abundance at both banks post-spill (species richness on Ewing Bank reduced by 42% and on Sackett Bank by 29%) (Felder et al. 2014), however, these banks are exposed to influences from Mississippi River discharges that vary year to year, so definitive links to the oil spill were not possible. Petroleum residues were observed on Ewing Bank and it is possible that this may have caused localised mortalities, reduced fecundity of surviving female decapods and/or reduced recruitment (Felder et al. 2014). Felder et al. (2014) also notes that freshly caught soft-sediment decapod samples caught in early and mid-2011 near the spill site exhibited lesions that were severe enough to cause appendage loss and mortality. Other possible impacts from the presence of dispersed and non-dispersed oil include effects of oxygen depletion in bottom waters due to bacterial metabolism of oil (and/or dispersants), and light deprivation under surface oil (NRDA 2012). Water quality in benthic habitats exposed to entrained hydrocarbons would be expected to return to background conditions within weeks to months of contact. Several studies have indicated that rapid recovery rates may occur even in cases of heavy oiling (National Academies Press 2003).

Marine Invertebrates
Predicted Level of Impact
The physical properties of the hydrocarbons and the well- mixed nature of the waters known within this area, indicates that prolonged exposure to hydrocarbons at relevant exposure thresholds is considered relatively unlikely. Given exposure is limited to in-water hydrocarbons within the upper 0 – 10 m of the water column, and not within the deeper areas of the water column where rock lobster and giant crab species are found, impacts to these species are not predicted. However, nearshore species such as abalone, bimbalas, mussels, oysters and pipis which occur within the upper 0 – 10 m of the water column may be exposed to hydrocarbons. Consequently, the potential consequence to invertebrates, including commercially and recreationally fished and culturally important species, are considered to be **Moderate (2)**, as they could result in medium-term impacts on a small portion of the invertebrate population (in shallow waters), with no population level impact expected.

Fish

Fish			
Predicted Hydrocarbon Exposure	✘ **Surface**	✓ **In-water**	✘ **Shoreline**
Relevant Exposure Thresholds	**Moderate Exposure Thresholds (Dissolved)** **High Exposure Thresholds (Entrained)**		
Condensate	**MDO**		
Several fish species may be present within the area exposed to moderate thresholds of dissolved (50 ppb) and high thresholds of entrained (100 ppb) hydrocarbons following a LOWC of condensate (see Section 6.4.7.3 for all EPBC-listed fish species). Demersal species may be susceptible to oiled sediments, particularly species that are site restricted. Any pelagic fish and shark species that occupy the water column, specifically within the upper 0 – 10 m of the water column the surface layers of the water column (where in-water hydrocarbon exposure at relevant exposure thresholds is predicted), are more susceptible to entrained and dissolved hydrocarbons. Since fish and sharks do not generally break the sea surface, the impacts of surface hydrocarbons to fish and shark species are unlikely to occur. Near the sea surface, fish are able to detect and avoid contact with surface slicks meaning fish mortalities rarely occur in the event of a hydrocarbon spill in open waters (Volkman et al. 1994). Besides an overlap with the white shark distribution BIA, which resides within the release location, the modelling predicted an overlap with the foraging and breeding BIA for the white shark by moderate thresholds of dissolved (27% and 1% probabilities, respectively) (RPS 2023). High threshold levels of entrained hydrocarbons (100 ppb) were also predicted to overlap the foraging BIAs of the white shark (78% probability) (RPS 2023). No overlap with grey nurse shark BIAs at relevant exposure thresholds is predicted.	Several fish species may be present within the area exposed to moderate thresholds of dissolved (50 ppb) and high thresholds of entrained (100 ppb) hydrocarbons following a vessel LOC of MDO (see Section 6.4.7.3) for all EPBC-listed fish species). Besides an overlap with the white shark distribution BIA (within which the modelled release locations are located), the modelling predicted an overlap with the foraging BIA by only the high thresholds of entrained (100 ppb) hydrocarbons (2% probability). No BIA outside of where the release location is located was predicted to be impacted by moderate threshold of dissolved (50 ppb) hydrocarbons. The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS 2023).		
Predicted Environmental Impact			
In-water			
Fish (including) sharks can be exposed to in-water hydrocarbon droplets through a variety of pathways, including:			

Fish
• Direct dermal contact (e.g. whilst swimming through oil or waters with elevated dissolved hydrocarbon concentrations and other constituents, with diffusion across their gills (Hook et al. 2016)), • Ingestion (e.g. directly or via food base, fish that have recently ingested contaminated prey may themselves be a source of contamination for their predators), and • Inhalation (e.g. elevated dissolved contaminant concentrations in water passing over the gills). Exposure to hydrocarbons entrained or dissolved in the water column can be toxic to fish. Studies have shown a range of impacts including changes in abundance, decreased size, inhibited swimming ability, changes to oxygen consumption and respiration, changes to reproduction, immune system responses, DNA damage, visible skin and organ lesions and increased parasitism. However, many fish species can metabolise toxic hydrocarbons, which reduces the risk of bioaccumulation of contaminants in the food web (and human exposure to contaminants through the consumption of seafood) (NRDA 2012). Sub-lethal impacts in adult fish include altered heart and respiratory rates, gill hyperplasia, enlarged liver, reduced growth, fin erosion, impaired endocrine systems, behavioural modifications and alterations in feeding, migration, reproduction, swimming, schooling, and burrowing behaviour (Kennish 1996). Fish exposed to aromatics in the water have been shown to have a reduced aerobic capacity, which may be a result of the process to eliminate ingested oil from the fish (Cohen et al. 2005). However, generally these species are highly mobile species, and their patterns of movements makes it unlikely for them to remain within the area long enough to be exposed to hydrocarbons to experience sub-lethal impacts (ITOPF 2011a). The exception would be in areas such as reefs and other seabed features where species are less likely to move away into open waters (i.e., site-attached species). Pelagic species fish are able to detect and avoid contact with surface slicks meaning fish mortalities rarely occur in the event of a hydrocarbon spill in open waters (Volkman et al. 1994). As a result, wide-ranging pelagic fish of the open ocean generally are not highly susceptible to impacts from surface hydrocarbons. Adult fish kills reported after oil spills, occur mainly to shallow water, near-shore benthic species (Volkman et al. 1994). Fish are most vulnerable to hydrocarbons during their embryonic, larval and juvenile life stages. Embryos and larvae may sustain mechanical damage to feeding and breathing apparatus from contact with oil droplets, and genetic damage, physical deformities and altered developmental timing from hydrocarbons in water (Fodrie and Heck, 2011). There may also be chronic effects to fish exposed to hydrocarbons in early life stages, such as disruption of predator avoidance behaviour (Hjermann et al. 2007). Eggs and larvae exposed to weathered concentrations of hydrocarbons in water for a prolonged period of time have been shown to be immunosuppressed (Hjermann et al. 2007). Hydrocarbons in the water column can physically affect fish with high site fidelity. When exposed for an extended duration (weeks to months) coating of gills may lead to lethal and sub-lethal effects from reduced oxygen exchange and coating of body surfaces may lead to increased incidence of irritation and infection. Fish may also ingest hydrocarbon droplets or contaminated food, leading to reduced growth (Volkman et al. 1994). Studies of impacts on bony fishes report that light, volatile oils are likely to be more toxic to fish. Many studies conclude that exposure to PAHs and soluble compounds are responsible for the majority of toxic impacts observed in fish (e.g., Carls et al. 2008; Ramachandran et al. 2004). The threshold value for species toxicity in the water column is based on global data from French et al. (1999) and French-McCay (2002, 2003) This data showed that species sensitivity (fish and invertebrates) to dissolved aromatics exposure of >4 days (96-hour LC50) under different environmental conditions varied from 6 to 400 µg/L (ppb), with an average of 50 ppb. This range covered 95% of aquatic organisms tested, which included species during sensitive life stages (eggs and larvae). Based on scientific literature, a minimum threshold of 6 ppb over 96 hours or equivalent was used to assess in-water low exposure zones (Engelhardt 1983; Clark 1984; Geraci and St Aubin 1988; Jenssen 1994; Tsvetnenko 1998). French-McCay (2002) indicates that an average 96-hour LC50 of 50 ppb could serve as an acute lethal threshold to 50%. Large scale fish kills have rarely been observed as a result of hydrocarbon spills (ITOPF 2011a) (though mortality in aquaculture pens has been reported), which is likely to be because vertebrates can rapidly metabolise and excrete hydrocarbons (Hook et al. 2016). Furthermore, the majority of studies, either from laboratory trials or of fish collected

Fish
after spill events (including the Hebei Spirit, Macondo, and Sea Empress spills), found evidence of elimination of PAHs in fish tissues returning to reference levels within two months of exposure when subsequently exposed to clean water (Challenger and Mauseth 2011; Davis et al. 2002; Gagnon & Rawson 2011; Gohlke et al. 2011; Jung 2011; Law 1997; Rawson et al. 2011). Recovery of fish assemblages depends on the intensity and duration of an unplanned discharge, the composition of the discharge and whether dispersants are used, as each of these factors influences the level of exposure to potential toxicants. Recovery would also depend on the life cycle attributes of fishes. Species that are abundant, short-lived and highly fecund may recover rapidly. However less abundant, long-lived species may take longer to recover. The range of movement of fishes will also influence recovery. The nature of the receiving environment would influence the level of impact on fishes.
Predicted Level of Impact
There is a known distribution, foraging and breeding BIA for the white shark in the area exposed to in-water hydrocarbons (RPS 2023), however, it is not expected that this species spends a large amount of time close to the surface (within the 0-10 m water depth) where thresholds may be highest. Pelagic free-swimming fish and sharks are unlikely to suffer long-term damage from oil spill exposure because dissolved/entrained hydrocarbons in water are not expected to be sufficient to cause harm (ITOPF, 2011a). Furthermore, impacts on eggs and larvae entrained in the upper water column are not expected to be significant given the temporary period of water quality impairment, and the limited geographical extent of the spill. As egg/larvae dispersal is extensive in the upper layers of the water column and it is expected that current induced drift will rapidly replace any affected populations. Impacts to King George whiting spawning and recruitment was raised by a stakeholder (Stakeholder ID 25165861) in relation to the Corner Inlet Fishery. However, exposure at the moderate thresholds of dissolved (50 ppb) and high thresholds of entrained (100 ppb) hydrocarbons are not predicted within Corner Inlet. Consequently, the potential consequence to fish, including eggs/larvae and those commercially and recreationally fished and culturally important, are considered to be **Moderate (2)**, as they could be expected to result in localised low-level, short-term impacts to species of commercial, conservation and cultural value.

Birds

Birds		
Predicted Hydrocarbon Exposure	✓ **Surface** ✓ **In-water** ✓ **Shoreline**	
Relevant Exposure Thresholds	**Surface: Moderate Exposure Threshold** **In-water: Moderate Exposure Threshold (Dissolved) and High Exposure Threshold (Entrained)** **Shoreline: Moderate Exposure Threshold**	
Condensate	**MDO**	
Several threatened, migratory and/or listed marine bird species have the potential to be rafting, resting, diving and feeding within the area predicted to be contacted by surface hydrocarbons; diving or foraging within in-water hydrocarbons; and foraging or nesting within shoreline exposure following a LOWC of condensate. The modelling predicted a maximum distance of 88 km for surface hydrocarbons at, or above, the moderate threshold for the worst-case scenario (RPS 2023). The extent of the in-water hydrocarbons overlaps foraging BIAs for several species, such as various albatross species (i.e. antipodean, black-browed, Bullers, Campbell, Indian-yellow-nosed, shy and wandering), petrels (white-face storm and common-diving), little penguin, black-faced cormorant, and the wedge-tailed shearwater (see Section 6.4.7.4 for the full list). Based on the worst-case scenario, the modelling predicted the highest probability of shoreline accumulation at, or above, the moderate (100 g/m^2) threshold to occur at King Island (81%), followed by Colac Otway (37% probability), with the minimum time for shoreline contact predicted as 9 days (King Island) and 7 days (Colac Otway), with a peak volumes ashore of 188 m^3 and 96 m^3 respectively, (RPS 2023).	Several threatened, migratory and/or listed marine species have the potential to be rafting, resting, diving and feeding within the area predicted to be contacted by surface hydrocarbons; diving or foraging within in-water hydrocarbons; and foraging or nesting within shoreline exposure following a LOWC of condensate. The modelling predicted a maximum distance of 57 km for surface hydrocarbons at, or above, the moderate threshold for the worst-case scenario (RPS 2023). Based on the worst-case scenario, the modelling predicted the highest probability of shoreline accumulation at, or above, the moderate (100 g/m^2) threshold to occur at king Island (13%), followed by Colac Otway (6% probability), with the minimum time for shoreline contact predicted as 7 days (King Island) and 2 days (Colac Otway), with a peak volumes ashore of 29 m^3 and 35 m^3 respectively, (RPS 2023). The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS 2023).	
Predicted Environmental Impact		
Surface	**In-water**	**Shoreline**
Seabirds rafting, resting, diving or feeding within surface hydrocarbons may be exposed to surface hydrocarbons. Species most at risk include those that readily rest on the sea surface (such as shearwaters) and surface plunging species such as terns and boobies.	Seabirds could be impacted by in-water hydrocarbon exposure directly (i.e., whilst diving through the water column foraging) or indirectly (i.e. by consuming hydrocarbon-tainted fish, resulting in sub-lethal or toxic impacts).	Shorebird species foraging for invertebrates in intertidal feeding habitats, such as exposed sand and mud flats at lower tides, will be at potential risk of both direct impacts through contamination of individual birds (ingestion or soiling of feathers) and indirect impacts

Birds		
Direct contact with hydrocarbons is likely to foul plumage, which may result in hypothermia due to a reduction in the ability of the bird to thermo-regulate and impaired waterproofing (ITOPF 2011a). Increased heat loss as a result of a loss of water-proofing results in an increased metabolism of food reserves in the body, which is not countered by a corresponding increase in food intake and may lead to emaciation (DSEWPaC 2011a). A bird suffering from cold, exhaustion and a loss of buoyancy (resulting from fouling of plumage) may dehydrate, drown or starve (ITOPF 2011a; DSEWPaC 2011a; AMSA 2013). Physical smothering may also result in impaired navigation and flight performance (Hook et al. 2016). Toxic effects on birds, including internal tissue irritation in their lungs and stomachs, may also result where the oil is ingested as the bird attempts to preen its feathers (ITOPF 2011a). The preening process may also spread oil over otherwise clean areas of the body (ITOPF 2011a). Whether this toxicity ultimately results in mortality will depend on the amount consumed and other factors relating to the health and sensitivity of the bird. In a review of 45 marine hydrocarbon spills, there was no correlation between the numbers of bird deaths and the volume of the spill (Burger 1993).	Penguins may be especially vulnerable to oil because they spend a high portion of their time in the water and readily lose insulation and buoyancy if their feathers are oiled. The Iron Baron vessel spill, of 325 tonnes of bunker fuel in Tasmania in 1995, is estimated to have resulted in the death of up to 20,000 penguins (Hook et al. 2016). As seabirds are top order predators, any impact on other marine life (e.g., pelagic fish) from hydrocarbon exposure may disrupt and limit food supply both for the maintenance of adults and the provisioning of young. Furthermore, the foraging BIAs are typical over relatively extensive areas, therefore, impacts are not anticipated at a population level due to the localised and temporary exposure of moderate levels of surface hydrocarbons.	through the contamination of foraging areas that may result in a reduction in available prey items (Clarke 2010). Any direct impact of oil on terrestrial habitats has the potential to contaminate seabirds present at the breeding sites (Clarke 2010). Bird eggs may also be damaged if an oiled adult sits on the nest. Fresh crude was shown to be more toxic than weathered crude, which had a medial lethal dose of 21.3 mg/egg (Clarke 2010). Studies of contamination of duck eggs by small quantities of crude oil, mimicking the effect of oil transfer by parent birds, have been shown to result in mortality of developing embryos (French-McCay, 2009). Shoreline accumulation will be concentrated along the high tide mark while the lower/upper parts are often untouched (IPIECA, 1995). As breeding activities of shorebirds and seabirds generally occurs above the high tide mark, exposure to hydrocarbons is considered unlikely to occur. However, oiled bird species may track oil into their nests, which may then have subsequent impacts on any eggs present. The little penguin, is the species where this would be the highest risk, as they have to traverse through the intertidal area to reach nesting sites.
Predicted Level of Impact		
Acute or chronic toxicity impacts (death or long-term poor health) to seabirds is possible, however, the presence of birds within areas exposed to moderate threshold levels is expected to be limited, due to the transitory nature of foraging individuals, and given the absence of offshore aggregation areas in the area. Based on the worst-case scenario, the modelling predicted the highest probability of shoreline accumulation at, or above, the moderate (100 g/m^2) threshold to occur at King Island (81%), followed by Colac Otway (37% probability), with the minimum time for shoreline contact predicted as 9 days (King Island) and 7 days (Colac Otway), with a peak volumes ashore of 188 m^3 and 96 m^3 respectively, (RPS 2023).		

Birds
However, due to the anticipated hydrocarbon weathering and fate of the condensate, majority is expected to have either evaporated or entrained during that time. Modelling predicted between approximately 70-82% of the volume to evaporate and between 0-22% to entrain within the first 24 hours, depending on the wind conditions (RPS 2023). Furthermore, tidal and wave action within the area is anticipated to breakdown any shoreline hydrocarbons. Consequently, the potential consequence to seabirds and shorebirds is considered to be **Moderate (2)**, as they could be expected to result in minor, short-term impact to species of recognised conservation value.

Marine Reptiles

Marine Reptiles		
Predicted Hydrocarbon Exposure	✓ **Surface**	✓ **In-water** ✓ **Shoreline**
Relevant Exposure Thresholds	**Surface: Moderate Exposure Threshold** **In-water: Moderate Exposure Threshold (Dissolved) and High Exposure Threshold (Entrained)** **Shoreline: Moderate Exposure Threshold**	
Condensate	**MDO**	
Marine turtles may be exposed to hydrocarbon when transiting through in-water hydrocarbons, surfacing to breathe within the surface slick, or nesting on oiled shorelines following a LOWC of condensate. There are no BIAs or habitat critical to the survival of the species (Section 6.4.7.5) within the area predicted to be exposed to moderate thresholds of surface, shoreline and dissolved (in-water) hydrocarbons or high thresholds of entrained (in-water) hydrocarbons.	Marine turtles may be exposed to hydrocarbon when transiting through the in-water hydrocarbons, surfacing to breathe within the surface slick, or nesting on oiled shorelines following a vessel LOC of MDO. The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS 2023). There are no BIAs or habitat critical to the survival of the species (Section 6.4.7.5) within the area predicted to be exposed to moderate thresholds of surface, shoreline and dissolved (in-water) hydrocarbons or high thresholds of entrained (in-water) hydrocarbons.	
Predicted Environmental Impact		
Marine sea turtles are vulnerable to the effects of oil at all life stages—eggs, post-hatchlings, juveniles, and adults in nearshore waters. Several aspects of marine turtle biology and behaviour place them at particular risk (NOAA 2010a), including a lack of avoidance behaviour, indiscriminate feeding in convergence zones, and large pre-dive inhalations. Oil exposure affects different turtle life stages in different ways. Turtles may be exposed to chemicals in oil in two ways: • Internally – eating or swallowing oil, consuming prey containing oil-based chemicals, or inhaling of volatile oil related compounds; and • Externally – swimming in oil or dispersants, or oil or dispersants on skin and body. Effects of oil on turtles include: • Increased egg mortality and developmental defects, • Direct mortality due to oiling in hatchlings, juveniles, and adults, and • Negative impacts to the skin, blood, digestive and immune systems and salt glands.		
Surface	**In-water**	**Shoreline**

Marine Reptiles		
Marine turtles make large, rapid inhalations before they dive which may result in inhalation of toxic vapours from hydrocarbons in surface waters (Milton and Lutz, 2003). This can lead to respiratory irritation, inflammation, emphysema or pneumonia (NOAA 2010a). Ingested oil may cause harm to the internal organs of turtles. Visibly oiled turtles showed higher indicators of polycyclic aromatic hydrocarbons (PAH) in tissues, stomach content, colon content and faeces compared to non-visibly oiled turtles (Ylitalo et al. 2017). This exposure pathway may cause an increase in the production of white blood cells and may affect the functioning of their salt gland (Lutcavage et al. 1995). Oiling has the potential to cause mortality depending on the size of the individual and the extent of oiling (DWH Natural Resource Damage Assessment Trustees, 2016).	Some individual marine reptiles may come into contact with in-water hydrocarbon exposure while swimming or feeding. Entrained hydrocarbons can adhere to body surfaces (Gagnon and Rawson 2010) and can enter cavities such as the eyes, nostrils, or mouth. This can cause an elevated susceptibility to infections (NOAA 2010a). Records of oiled wildlife during spills rarely include marine turtles, even from areas where they are known to be relatively abundant (Short 2011). An exception to this was the large number of marine turtles collected (613 dead and 536 live) during the Macondo spill in the Gulf of Mexico, although many of these animals did not show any sign of oil exposure (NOAA 2013). Of the dead turtles found, 3.4% were visibly oiled and 85% of the live turtles found were oiled (NOAA 2013). Of the captured animals, 88% were later released, suggesting that oiling does not inevitably lead to mortality.	Marine turtles may experience oiling impacts on nesting beaches when they come ashore to lay their eggs. There is potential for contamination of turtle eggs to result in toxic impacts, such as developmental defects in hatchlings, to developing embryos. Studies on freshwater snapping turtles showed uptake of polycyclic aromatic hydrocarbons (PAHs) from contaminated nest sediments, but no impacts on hatching success or juvenile health following exposure of eggs to dispersed weathered light crude (Rowe et al. 2009). However, other studies found evidence that exposure of freshwater turtle embryos to PAHs results in deformities (Bell et al. 2006, Van Meter et al. 2006). Turtle hatchlings may be more vulnerable to smothering as they emerge from the nests and make their way over the intertidal area to the open water (AMSA 2015). Hatchlings that contact oil residues while crossing a beach can exhibit a range of effects including impaired movement and bodily functions (Shigenaka 2010). Hatchlings sticky with oily residues may also have more difficulty crawling and swimming, rendering them more vulnerable to predation. Marine pollution is listed as a threat to marine turtle in the Recovery Plan for Marine Turtles in Australia, 2017 – 2027, particularly in relation to shoreline oiling of nesting beaches.

Predicted Level of Impact

The number of marine turtles that may be exposed to hydrocarbons during a spill event is expected to be low due to the localised and temporary presence of surface hydrocarbons at moderate exposure levels and the absence of BIAs or habitat critical to the survival of the species within this area. The potential impact would be limited to individual transiting marine turtles, with population impacts not anticipated. Furthermore, there are no nesting beaches within the Planning Areas, and the activity will be conducted in a manner which is not inconsistent with the relevant management actions.

Consequently, the potential consequence to marine turtles is considered to be **Moderate (2)**, as they could be expected to result in minor, short-term impact to species of recognised conservation value.

Pinnipeds

Pinnipeds		
Predicted Hydrocarbon Exposure	✓ **Surface** ✓ **In-water** ✓ **Shoreline**	
Relevant Exposure Thresholds	**Surface: Moderate Exposure Threshold** **In-water: Moderate Exposure Threshold (Dissolved) and High Exposure Threshold (Entrained)** **Shoreline: Moderate Exposure Threshold**	
Condensate	**MDO**	
Pinnipeds may be present within the area exposed to hydrocarbons following a LOWC of condensate. Individuals have the potential to be impacted by surface hydrocarbons when surfacing to breathe, in-water hydrocarbons when transiting through the area, and shoreline accumulated hydrocarbons that occur at haul-out sites along the coastline. The modelling predicted a maximum distance of 88 km for surface hydrocarbons at, or above, the moderate threshold for the worst-case scenario (RPS 2023). Important breeding sites for the Australian fur seal, such as Seal Rocks and Kanowna Island, off the coast of Victoria colonies may be exposed to hydrocarbons, Therefore, hydrocarbon exposure to individual whilst transit through exposed nearshore waters to breeding sites may be impacted. However, no BIAs for pinnipeds were identified within the area predicted to exposed to moderate thresholds of surface, shoreline and dissolved (in-water) hydrocarbons or high thresholds of entrained (in-water) hydrocarbons (see Section 6.4.7.7).	Pinnipeds may be present within the area exposed to hydrocarbons following a vessel LOC of MDO. Individuals have the potential to be impacted by surface hydrocarbons when surfacing to breathe, in-water hydrocarbons when transiting through the area, and shoreline accumulated hydrocarbons that occur at haul-out sites along the coastline. The modelling predicted a maximum distance of 57 km for surface hydrocarbons at, or above, the moderate threshold for the worst-case scenario (RPS 2023). The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS 2023).	
Predicted Environmental Impact		
Surface	**In-water**	**Shoreline**
Pinnipeds are vulnerable to sea surface exposures given they spend much of their time on or near the surface of the water, to breathe and regularly haul out on to beaches. As a result of exposure to surface oils, pinnipeds, with their relatively large, protruding eyes are particularly vulnerable to effects such as irritation to mucous	Pinnipeds are sensitive to in-water hydrocarbon exposure as they will stay near established colonies and haul-out areas, meaning they are less likely to practice avoidance behaviours. This is corroborated by Geraci and St. Aubins (1988) who suggest seals, sea-lions and fur-seals have been observed swimming in oil slicks during a number of documented spills.	Breeding colonies may be sensitive to hydrocarbon spills in the event of shoreline accumulation. Individual adults may also be impacted by oil while transiting through the nearshore environments at haul-out sites that may be impacted from the spill event. Following the Iron Baron oil spill (in Tasmania 1995) nearby seal colonies were monitored. The report

Pinnipeds		
membranes that surround the eyes. Irritation may also occur to mucous membranes that line the oral cavity, respiratory surfaces, and anal and urogenital orifices. Hook et al. (2016) reports that seals appear not to be very sensitive to contact with oil, but instead to the toxic impacts from the inhalation of volatile components. For some pinnipeds, fur is an effective thermal barrier because it traps air and repels water. Petroleum stuck to fur reduces its insulative value by removing natural oils that waterproof the pelage. Consequently, the rate of heat transfer through fur seal pelts can double after oiling (Geraci & St. Aubin 1988), adding an energetic burden to the animal. Kooyman et al. (1976) suggest that fouling of approximately one-third of the body surface resulted in 50% greater heat loss in fur-seals immersed in water at various temperatures. Heavy oil coating and tar deposits on fur-seals may result in reduced swimming ability and lack of mobility out of the water. Pinnipeds other than fur-seals are less threatened by thermal effects of fouling, if at all (Helm et al. 2015). Oil has no effect on the relatively poor insulative capacity of sea-lion and bearded and ringed seal pelts, and oiled Weddell seal samples show some increase in conductance (Oritsland 1975; Kooyman et al. 1976, 1977). ITOPF (2011a) demonstrates that species that rely on fur to regulate their body temperature (such as fur-seals) are most vulnerable to oil, as the animals may die from hypothermia or overheating, depending on the season, if the fur becomes matted with oil. It is reported that most pinnipeds scratch themselves vigorously with their flippers and do not lick or groom themselves, so are less likely to ingest oil from skin surfaces (Geraci & St. Aubin 1988). However, mothers trying to clean an oiled pup may ingest oil. Ingested hydrocarbons can irritate or destroy epithelial cells that	Hydrocarbons within the water column or consumption of prey affected by the oil may cause sub-lethal impacts to pinnipeds. However, impacts to pinnipeds at a population level are considered very unlikely given their transient, highly mobile nature and their typically extensive foraging grounds.	concluded that reduced pup production was evident on islands close to the spill, but not evident on islands more distant (Pemberton 1999) Conservation Listing Advice for the *Neophoca cinerea* (Australian sea lion) (TSSC, 2010) identifies oil spills as a potential threat to habitat. However, activities within this Environment Plan will not be inconsistent with the conservation and management priorities outlined in this advice.

Pinnipeds
line the stomach and intestine, thereby affecting motility, digestion and absorption.
Predicted Level of Impact
Physical contact with diesel and condensate which are light hydrocarbons are unlikely to result in levels of oiling and matting of pelts to results in seals not being able to thermal regulate. Impacts to the Australian sea lion are unlikely as they do not have fur, breed outside the Planning Area and is a specialised benthic forager, i.e. it feeds primarily on the sea floor (DSEWPaC 2013). Individual pinnipeds may be exposed to hydrocarbons within the near-shore waters and accumulated on the shoreline in areas where colonies and breeding/haul out sites are present, and hydrocarbons are above the moderate exposure threshold such as along the Otway coast, Seals Rocks and Kanowna Island and Maatsuyker Island. Consequently, the potential consequence to pinnipeds are considered to be **Moderate (2)**, as they could be expected to result in minor, short-term impact to species of recognised conservation value.

Cetaceans

Cetaceans	
Predicted Hydrocarbon Exposure	✓ **Surface** ✓ **In-water** ✗ **Shoreline**
Relevant Exposure Thresholds	**Surface: Moderate Exposure Threshold** **In-water: Moderate Exposure Threshold (Dissolved) and High Exposure Threshold (Entrained)**
Condensate	**MDO**
Several threatened, migratory and/or listed cetacean species may occur within the area predicted to be exposed to moderate levels of surface hydrocarbons following a LOWC of condensate (see Section 6.4.7.6) including: • Blue, fin, humpback, pygmy right and sei foraging, feeding or related behaviour. • Pygmy blue whale foraging BIAs • Southern right whale migration BIA. The modelling predicted a maximum distance of 88 km for surface hydrocarbons at, or above, the moderate threshold for the worst-case scenario (RPS 2023).	Several threatened, migratory and/or listed cetacean species may occur within the area predicted to be exposed to moderate levels of surface hydrocarbons following a LOC of MDO (see Section 6.4.7.6) including: • Blue, fin, pygmy right and sei foraging, feeding or related behaviour. • Pygmy blue whale foraging BIAs • Southern right whale migration BIA. • The modelling predicted a maximum distance of 57 km for surface hydrocarbons at, or above, the moderate threshold for the worst-case scenario (RPS 2023).
Several threatened, migratory and/or listed cetacean species may occur within the area predicted to be exposed to moderate dissolved or high entrained exposure (in the upper 0 -10 m of the water column) which thresholds in the water column following a LOWC of condensate (see Section 6.4.7.6) including: • Blue, fin, humpback, pygmy right and sei foraging, feeding or related behaviour. • Pygmy blue whale foraging BIAs • Southern right whale migration and reproduction BIAs.	Several threatened, migratory and/or listed cetacean species may occur within the area predicted to be exposed to moderate dissolved or high entrained exposure (in the upper 0 -10 m of the water column) which thresholds in the water column following a LOC of MDO (see Section 6.4.7.6) including: • Blue, fin, humpback, pygmy right and sei foraging, feeding or related behaviour. • Pygmy blue whale foraging BIAs • Southern right whale migration and reproduction BIAs.
Predicted Environmental Impact	
Cetaceans can be exposed to the chemicals in oil through: • Dermal contact, by swimming in oil and having oil directly on the skin and body (NRDA 2012; Hook et al. 2016). • Inhaling volatile oil compounds when surfacing to breathe. • Internal exposure by consuming oil or contaminated prey. The effects of this exposure include: • Maternal transfer of contaminants to embryos.	

Cetaceans	
• Hypothermia due to conductance changes in skin, resulting in metabolic shock (expected to be more problematic for non-cetaceans in colder waters). • Toxic effects and secondary organ dysfunction due to ingestion of oil. • Congested lungs. • Damaged airways. • Interstitial emphysema due to inhalation of oil droplets and vapour. • Gastrointestinal ulceration and haemorrhaging due to ingestion of oil during grooming and feeding. • Eye and skin lesions from continuous exposure to oil. • Decreased body mass due to restricted diet. • Stress due to oil exposure and behavioural changes.	
Surface	**In-water**
Cetaceans may come into contact with surface hydrocarbons when surfacing. However, direct surface oil contact with hydrocarbons is considered to have little deleterious effect on cetaceans, and any effect is likely to be minor and temporary. This may be due to the skin's effectiveness as a barrier to toxicity (Geraci & St Aubin 1988). Cetaceans have mostly smooth skins with limited areas of pelage (hair covered skin) or rough surfaces such as barnacled skin. Oil tends to adhere to rough surfaces, hair, or calluses of animals, so contact with hydrocarbons by cetaceans is expected to cause only minor hydrocarbon adherence. Helm et al. (2015) detailed that oil does not adhere to cetacean's relatively slick skin and it would not be expected to accumulate in or around the eyes, mouth, blow hole, or other potentially sensitive external areas. Insulation is provided by a layer of blubber rather than hair or fur, so it is unlikely oil would compromise the thermoregulatory system of cetaceans. The inhalation of oil droplets, vapours and fumes is a distinct possibility if cetaceans' surface in slicks to breathe (Helm et al. 2015). Exposure to hydrocarbons in this way could damage mucous membranes and damage airways threatening their health. The risk is greatest near the source of a fresh spill because volatile toxic vapours disperse relatively quickly (Helm et al. 2015). The susceptibility to ingested hydrocarbon has also been shown to vary with feeding habits. Baleen whales (such as blue, fin, pygmy right and sei) are not particularly susceptible to ingestion of oil in the water column but are susceptible to oil at the sea surface as they feed by skimming the surface. Oil may stick to the baleen while they 'filter feed' near slicks. Sticky, tar-like residues are particularly likely to foul the baleen	Cetaceans exposed to entrained hydrocarbons can result in physical coating as well as ingestion (Geraci and St Aubin, 1988). Such impacts are associated with 'fresh' hydrocarbon, the risk of impact declines rapidly as the hydrocarbon weathers. The susceptibility to ingested hydrocarbon has also been shown to vary with feeding habits. Specifically, toothed whales and dolphins may be susceptible to ingestion of dissolved and entrained oil as they gulp feed at depth. There are reports of declines in the health of individual pods of killer whales (a toothed whale species), though not the population as a whole, in Prince William Sound after the Exxon Valdez vessel spill (heavy oil) (Hook et al. 2016). Geraci (1988) found little evidence of cetacean mortality from hydrocarbon spills; however, some behaviour disturbance (including avoidance of the area) may occur. Pelagic species have been said to avoid hydrocarbon, mainly because of its noxious odours, but this has not been proven. In the event that avoidance were to occur, the potential for physiological impacts from contact with hydrocarbons would be reduced, however, active avoidance of an area may disrupt behaviours such as migration, or displace individuals from important habitat, such as foraging, resting or breeding. Although, the strong attraction to specific areas for breeding or feeding may override any tendency for cetaceans to avoid the noxious presence of hydrocarbons. Dolphin populations from Barataria Bay, Louisiana, USA, which were exposed to prolonged and continuous oiling from the Macondo oil spill in 2010, had higher incidences of lung and kidney disease than those in the other urbanised

Cetaceans	
plates. However, the structural and chemical integrity of isolated baleen plates of seven species of whales were reported to remain intact when they were soaked in crude oil, gasoline, or tar over long periods (Helm et al. 2015).	environments (Hook et al. 2016). The spill may have also contributed to unusually high perinatal mortality in bottlenose dolphins (Hook et al. 2016).

Predicted Level of Impact

As highly mobile species, in general it is very unlikely that cetaceans will be constantly exposed to concentrations of hydrocarbons in the water column for continuous durations (e.g., >96 hours) that would lead to chronic toxicity effects. Furthermore, the potential for environmental impacts would be limited to a relatively short period following the release and would need to coincide with a migration or aggregation event to result in exposure to a large number of individuals. Regardless such exposure is not anticipated to result in long-term population viability effects. A proportion of the migrating population of whales could be affected for a single migration event, which could result in temporary and localised consequences.

The Conservation Management Plan for the Blue Whale (CoA 2015) and the draft National Recovery Plan for the Southern Right Whale (DCCEEW 2022a) detail that in extreme cases, acute chemical discharges such as oil or condensate have shown to cause long-term, population level declines due to toxicity and associated mortality. However, oil and condensate spills are rated as a minor consequence of individuals are affected but no affect at population level in both plans (CoA 2015). The study referred to in the plans is from Matkin et al. 2008 who looked at killer whale populations pre and port the Exxon Valdez crude oil spill. Crude oil is significantly heavier and does not breakdown as quickly as a condensate or diesel spill. Thus, for a diesel of condensate spill it is more likely that the minor consequence rating of individuals are affected but no affect at population level, is relevant.

The draft National Recovery Plan for the Southern Right Whale (DCCEEW 2022a) details that oil spills have the potential to have the greatest impact on Southern Right Whales within or near reproductive BIAs, when there are larger concentrations of whales engaged in breeding activities over sustained periods of time (i.e., weeks to months) and where oil may accumulate.

Consequently, the potential consequence to cetaceans is considered to be **Moderate (2)**, as they could be expected to result in minor, short-term damage to species of recognised conservation value.

7.12.5.3 Conservation Values and Sensitivities

Heritage Properties and Places

Heritage Places	
Predicted Hydrocarbon Exposure	**✗ Surface ✓ In-water ✓ Shoreline**
Relevant Exposure Thresholds	**Shoreline: Low Exposure Threshold** **In-water: High Exposure Threshold (Dissolved) and High Exposure Threshold (Entrained)r**
Condensate	**MDO**
The modelling predicted a number of Heritages Properties and Places (World, National, Commonwealth and Maritime Archaeological) to be present within the area predicted to be exposed to low levels of shoreline hydrocarbons following a LOWC of condensate (RPS 2023). These include: • World Heritage Properties (see Section 6.2.1 for further details): ◦ Tasmanian Wilderness • National Heritage Places (see Section 6.2.3 for further details): ◦ Great Ocean and Scenic Environments ◦ Point Nepean Defence Sites and Quarantine Station Area, and ◦ Tasmanian Wilderness, and ◦ Western Tasmania Aboriginal Cultural Landscape. • Commonwealth Heritage Places (see Section 6.2.4 for further details): ◦ HMAS Cerberus Marine and Coastal Area, and ◦ Swan Island and Naval Waters • Maritime Archaeological Heritage (see Section 6.2.5 for further details): ◦ Historical shipwrecks	The modelling predicted a number of Heritages Places (World, National, Commonwealth and Maritime Archaeological) to be present within the area predicted to be exposed to low levels of shoreline hydrocarbons following a vessel LOC of MDO (RPS 2023). These include: • World Heritage Properties (see Section 6.2.1 for further details): ◦ Tasmanian Wilderness • National Heritage Places (see Section 6.2.3 for further details): ◦ Western Tasmania Aboriginal Cultural Landscape. • Maritime Archaeological Heritage (see Section 6.2.5 for further details): ◦ Historical shipwrecks No Commonwealth Heritage Places were predicted to be exposed to relevant shoreline thresholds. The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS 2023).

Heritage Places	
Predicted Environmental Impact	
Shoreline	**In-water**
The values identified of these World, National and Commonwealth Heritage Areas (see Sections 6.2.1 to 6.2.4) have the potential to be impacted by surface hydrocarbons at the low threshold. Visible shoreline hydrocarbons may have the potential to reduce the visual amenity of the area, subsequently deterring any tourism or recreational activities, or impacting the cultural significant of the specific Heritage Place. Any impact to the environmental values of the areas (i.e., the unique habitats, species and ecosystem process) from exposure at, or above, the low threshold of shoreline hydrocarbons may also affect the value of the specific heritage areas. Refer also to: • Benthic Habitats • Marine Fauna • Nationally Important Wetlands • Recreation and Tourism • First Nations	Historical shipwrecks (see Section 6.2.5) have the potential to be impacted by in-water hydrocarbons above the high threshold. The is limited information on the effect of oil spills on historic shipwrecks. One laboratory study looked at how crude oil may impact preservation of steel shipwrecks. Salerno et al. (2018) found that crude oil and chemical dispersant could impact the biodiversity and metabolic function of microbial biofilms colonising metal-hulled shipwrecks this could have downstream effects on corrosion rates of metal hulls, potentially impacting their longevity in the marine environment. The laboratory tests were conducted with 5 mg/l (5000 ppb) of crude oil.
Predicted Level of Impact	
The minimum time for shoreline accumulation to reach a shoreline based on the worst-case scenario modelled is 4 days (Colac Otway, Corangamite, Cape Otway West, Apollo Bay and Moonlight Head). Therefore, this may be the worst-case minimum time before Heritage Places within this area are impacted by shoreline accumulation (i.e., Great Ocean and Scenic Environments). However, the minimum time predicted before shoreline accumulation at, or above, the low threshold for the West coast of Tasmania (i.e., Western Tasmania Aboriginal Cultural Landscape and Tasmanian Wilderness) is predicted to be 28 days (RPS 2023). Due to the anticipated hydrocarbon weathering and fate of the condensate, the majority is expected to have either evaporated or entrained during that time. Modelling predicted between approximately 70-82% of the volume to evaporate and between 0-22% to entrain within the first 24 hours, depending on the wind conditions (RPS 2023). Visible hydrocarbons along the shorelines at these locations can change the aesthetic value. However, given the nature of the condensate, being light non-persistent hydrocarbon, any impacts to visual aesthetic at heritage places are expected to be localised and short-term. The wave and tidal action, together with predicted weathering, indicates that hydrocarbons along shorelines will continually wash off the substrates, and be readily flushed into the water, leading to further weathering. Impacts to historical shipwrecks are not predicted as based on the oil spill modelling (RPS 2023) for in-water hydrocarbons above 5000 ppb are only predicted in 0 – 10 m below the sea surface near to the spill source where water depths are > 50 m. Thus, historical shipwrecks would not be exposed to oil above 5000 ppb.	

Heritage Places
Consequently, the potential consequence to Heritage Properties and Places is considered to be **Moderate (2)**, as they could be expected to result in minor, short-term impacts to an area of recognised conservation value.

Wetlands

Wetlands		
Predicted Hydrocarbon Exposure	✘ **Surface** ✘ **In-water** ✓ **Shoreline**	
Relevant Exposure Thresholds	**Shoreline: Low Exposure Threshold**	
Condensate	**MDO**	
Modelling predicted three Internationally Important Wetlands (Ramsar-listed wetlands) to be contacted by shoreline hydrocarbons at the relevant exposure thresholds following a LOWC of condensate (RPS, 2023), these included: • Glenelg Estuary and Discovery Bay Wetlands • Port Phillip Bay (Western Shoreline) and Bellarine Peninsula, and • Lavinia. Several additional wetlands of National Importance were also identified within the area predicted to be contacted by shoreline hydrocarbons at the relevant exposure thresholds (RPS, 2023). See Section 6.2.7 for a full list of these Nationally Important Wetlands. The major values for these wetlands have been identified within Section 6.2.6 and 6.2.7 of the EP and include values such as diverse waterbird diversity, unique ecological processes, shoreline and intertidal habitats, tourism, recreational activities, and sites of cultural significance for First Nations people.	Modelling predicted only one Internationally Important Wetlands (Ramsar-listed wetlands) to be contacted by low shoreline hydrocarbons at the relevant exposure thresholds following a vessel LOC of MDO (RPS, 2023): • Lavinia. Only a few wetlands of National Importance were also identified within the within the area predicted to be contacted by shoreline hydrocarbons at the relevant exposure thresholds (RPS, 2023), these included: • Princetown Wetlands • Lower Aire River Wetlands • Western Port • Lavina Nature Reserve The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS 2023).	
Predicted Environmental Impact		
Shoreline		
Internationally Important wetlands (Ramsar-listed wetlands) and Nationally Important Wetlands are predominantly saline marsh and estuarine environments that are a continuation from the sea. Therefore, depending on where the shoreline contact occurs there is a potential for shoreline hydrocarbon to move into the estuary and wetlands, potentially impacting the aesthetic and ecological value of the wetland. Visible hydrocarbons stranded on shorelines have the potential to reduce the visual amenity of the area for tourism and discourage recreational activities. Precautionary exclusion from shorelines may be implemented by local governments until water quality monitoring verifies the absence of residual hydrocarbons. This could cause disruption to some recreational and tourism activities within that area. Furthermore, visible hydrocarbons along shorelines may impact the value of a culturally significant sites. Wetland environments are considered to have a high sensitivity to hydrocarbon exposure. The vegetation found in wetlands, are similar to saltmarshes and other estuarine plants, typically have a large surface area for oil absorption and their structure traps oil. The degree of impact of oil on wetland vegetation are variable and complex, and can be both		

Wetlands
acute and chronic, ranging from short-term disruption of plant functioning to mortality. Spills reaching wetlands during the growing season will have a more severe impact than if oil reaches wetlands during the times when many plant species are dormant. Wetland habitats can be of particular importance for some species of waterbirds, fish, and invertebrates. As such, in addition to direct impacts on plants, oil that reaches wetlands also affects these fauna utilising wetlands during their life cycle.
Predicted Level of Impact
The minimum time for shoreline accumulation to reach a shoreline associated with a Ramsar-listed wetlands was 10 days for King Island (i.e. Lavina), 22 days for Glenelg (i.e. Glenelg Estuary and Discovery Bay Wetlands), and 73 days for Port Phillip (Queenscliff) (i.e. Port Phillip Bay (Western Shoreline) and Bellarine Peninsula) (RPS 2023). Due to the anticipated hydrocarbon weathering and fate of the condensate, majority is expected to have either evaporated or entrained during that time. Modelling predicted between approximately 70-82% of the volume to evaporate and between 0-22% to entrain within the first 24 hours, depending on the wind conditions (RPS 2023). Furthermore, given the nature of the condensate, being light non-persistent hydrocarbon, any impacts to coastlines are expected to be localised and short-term. Consequently, the potential consequence to these Internationally and Nationally important wetlands are considered to be **Moderate (2)**, as they could be expected to result in minor, short-term damage to an area of recognised conservation value.

State Protected Areas – Terrestrial

State Protected Areas - Terrestrial			
Predicted Hydrocarbon Exposure	✘ **Surface**	✘ **In-water**	✓ **Shoreline**
Relevant Exposure Thresholds			**Shoreline: Low Exposure Threshold**
Condensate	**MDO**		
Modelling predicted a multiple terrestrial State Protected Areas within the area predicted to be exposed to low levels of shoreline hydrocarbons following a LOWC of condensate (RPS, 2023). These include the terrestrial state protected areas identified within the planning Area (relevant low exposure threshold for shoreline hydrocarbons) located within Victoria, Tasmania, and NSW (see Section 6.2.9, 6.2.11, and 6.2.14 for further details for these State Protected Areas). The terrestrial State Protected Areas include values such as terrestrial habitats, ecological communities, unique coastal formations, and culturally significant sites which may be impacted by exposure to shoreline hydrocarbons at the relevant low exposure thresholds.	Modelling predicted several terrestrial State Protected Areas within the area predicted to be exposed to low levels of shoreline hydrocarbons following a vessel LOC of MDO (RPS, 2023). These include some of the terrestrial state protected areas identified within Victoria, and the King Island and Hunter Island State Protected Areas identified within the planning Area (relevant low exposure threshold for shoreline hydrocarbons for LOWC) (see Section 6.2.9, 6.2.11, and 6.2.14 for further details for these State Protected Areas). No terrestrial State Protected Areas within NSW of mainland Tasmania were predicted to be exposed to the shoreline hydrocarbons of relevant thresholds (RPS, 2023). The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS 2023).		
Predicted Environmental Impact			
Shoreline			
Visible shoreline hydrocarbons have the potential to reduce the visual amenity of the area for tourism and discourage recreational activities within the identified protected areas. Furthermore, hydrocarbons at the relevant threshold may impact values and sensitivities identified for this state protected areas, subsequently reducing the value of these locations. Refer also to: • Benthic Habitats • Shorebirds • Wetlands • Coastal Settlements • Recreation and Tourism			
Predicted Level of Impact			

State Protected Areas - Terrestrial
The minimum time for shoreline accumulation to reach a shoreline based on the worst-case scenario modelled is 4 days (Colac Otway, Corangamite, Cape Otway West, Apollo Bay and Moonlight Head). However, due to the anticipated hydrocarbon weathering and fate of the condensate, majority is expected to have either evaporated or entrained during that time. Modelling predicted between approximately 70-82% of the volume to evaporate and between 0-22% to entrain within the first 24 hours, depending on the wind conditions (RPS, 2023). Visible hydrocarbons along the shorelines at these located can change the aesthetic value. However, given the nature of the condensate, being light non-persistent hydrocarbon, any impacts to coastal settlements are expected to be localised and short-term. The wave and tidal action, together with predicted weathering, indicates that hydrocarbons along shorelines will continually wash off the substrates, and be readily flushed into the water, leading to further weathering. Consequently, the potential consequence to these State Marine Protected Areas is considered to be **Moderate (2)**, as they could be expected to result in minor, short-term damage to an area of recognised conservation value.

State Protected Areas – Marine

State Protected Areas - Marine		
Predicted Hydrocarbon Exposure	✓ **Surface** ✓ **In-water** ✗ **Shoreline**	
Relevant Exposure Thresholds	**Surface: Low Exposure Threshold** **In-water: Moderate Exposure Threshold (Dissolved) and High Exposure Threshold (Entrained)**	
Condensate	**MDO**	
Modelling predicted several Marine State Protected Areas within the area predicted to be exposed to low levels of surface and moderate levels of dissolved hydrocarbons and high levels of entrained hydrocarbons following a LOWC of condensate (RPS, 2023). These include protected areas within: • Victoria (see Section 6.2.8 for further details): ◦ Discovery Bay Marine National Park ◦ Twelve Apostles Marine National Park ◦ Point Addis Marine National Park ◦ Port Phillip Heads Marine National Park ◦ Mushroom Reef Marine Sanctuary ◦ Bunurong Marine Park and Marine National Park ◦ Wilsons Promontory Marine Park and Marine National Park ◦ Point Hicks Marine National Park ◦ Cape Howe Marine National Park ◦ Marengo Reefs Marine Sanctuary • Tasmania (see Section 6.2.10 for further details): ◦ Kent Group National Park ◦ Arthur Bay Conservation Area The major conservation values for these areas have been identified within Section 6.2.8 to 6.2.13 of the EP. The marine State Protected Areas include values such as important intertidal and coastal habitat for species, high species diversity and abundance, and culturally significant sites, which may be impacted by exposure to surface and in-water hydrocarbons at relevant exposure thresholds.	Modelling predicted several Marine State Protected Areas within the area predicted to be exposed to low levels of surface and moderate levels of dissolved hydrocarbons and high levels of entrained hydrocarbons following a vessel LOC of MDO (RPS, 2023). These include protected areas within: • Victoria (see Section 6.2.8 for further details): ◦ Twelve Apostles Marine National Park ◦ Marengo Reefs Marine Sanctuary No marine State Protected Area within Tasmania or NSW was predicted to be impacted by hydrocarbons at relevant thresholds (RPS 2023). The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS 2023).	

State Protected Areas - Marine	
The modelling predicted a maximum distance of 307 km for surface hydrocarbons at, or above, the low threshold for the worst-case scenario (RPS, 2023). Any values which occupy the water column, specifically within the upper 0 – 10 m of the water column the surface layers of the water column (where in-water hydrocarbon exposure at relevant exposure thresholds is predicted), are more susceptible to entrained and dissolved hydrocarbons.	
Predicted Environmental Impact	
Surface	**In-water**
Visible surface hydrocarbons (i.e., a rainbow sheen) have the potential to reduce the visual amenity of the area for tourism and discourage recreational activities. The values identified for these marine State Protected Areas have the potential to be exposed to surface hydrocarbons at, or above, the low threshold, in the event of a spill incident. Impact to these receptors from direct or indirect exposure to surface hydrocarbons may cause a subsequent negative impact to the value of the Protected Areas. Refer also to: • Recreation and Tourism • Seabirds	The values identified within these State Protected Areas have the potential to be exposed to entrained hydrocarbons at, or above, the moderate threshold in the event of a spill incident. Impact to these receptors from direct or indirect exposure to in-water hydrocarbons may cause a subsequent negative impact to the value of the State Protected Areas. Refer also to: • Macroalgae • Seagrass • Soft Corals • Marine Invertebrates • Fish • Birds • Marine Reptiles • Cetaceans • Heritage Places • First Nations
Predicted Level of Impact	
Due to the anticipated hydrocarbon weathering and fate of the condensate, majority is expected to evaporate during that time. Modelling predicted between approximately 70-82% of the volume to evaporate within the first 24 hours, depending on the wind conditions (RPS, 2023). Therefore, low concentrations are anticipated to remain at the water surface or be entrained within the water column.	

State Protected Areas - Marine
Consequently, the potential consequence to these State Marine Protected Areas is considered to be **Moderate (2)**, as they could be expected to result in minor, short-term damage to an area of recognised conservation value.

Australian Marine Parks

Australian Marine Parks	
Predicted Hydrocarbon Exposure	✓ **Surface** ✓ **In-water** ✗ **Shoreline**
Relevant Exposure Thresholds	**Surface: Low Exposure Threshold** **In-water: Low Exposure Threshold (Dissolved) and Low Exposure Threshold (Entrained)**
Condensate	**MDO**
Modelling predicted five AMPs to be intersect by surface or in-water hydrocarbons at the relevant thresholds (RPS, 2023), these include: • Apollo AMP (100% overlap) • Beagle AMP (approximately less than 20% overlap) • Boags AMP (100% overlap) • Franklin AMP (100% overlap) • Zeehan AMP (approximately less than 50% overlap) The major conservation values for these AMPs have been identified within Section 6.2.2 of the EP (i.e., ecosystems, habitats, EPBC-listed species, culturally significant sites) which may be impacted by exposure to surface and in-water hydrocarbons at relevant thresholds. Any values which occupy the water column, specifically within the upper 0 – 10 m of the water column the surface layers of the water column (where in-water hydrocarbon exposure at relevant exposure thresholds is predicted), are more susceptible to entrained and dissolved hydrocarbons. The modelling predicted a maximum distance of 307 km for surface hydrocarbons at, or above, the low threshold for the worst-case scenario (RPS, 2023), therefore, any values that utilise the water surface of the marine environment may also be impacted.	Modelling predicted three AMPs to be intersect by surface or in-water hydrocarbons at the relevant thresholds following the vessel LOC of MDO (RPS, 2023), these include: • Apollo AMP (approximately less 25% overlap) • Boags AMP (approximately less that 75% overlap) • Zeehan AMP (approximately less than 20% overlap) The modelling predicted a maximum distance of 57 km for surface hydrocarbons at, or above, the low threshold for the worst-case scenario (RPS, 2023) The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS 2023).
Predicted Environmental Impact	
Surface	**In-waterV**
Visible surface hydrocarbons (i.e., a rainbow sheen) have the potential to reduce the visual amenity of the area for tourism and discourage recreational activities.	The values identified within these AMPs have the potential to be exposed to entrained hydrocarbons at, or above, the moderate threshold in the event of a spill incident.

Australian Marine Parks	
The values identified within the AMPs have the potential to be exposed to surface hydrocarbons at, or above, the low threshold, in the event of a spill incident. Impact to these receptors from direct or indirect exposure to surface hydrocarbons may cause a subsequent negative impact to the value of the AMPs. Refer also to: • Seabirds • Recreation and Tourism • First Nations	However, the exposure of entrained hydrocarbons will be greatest within the upper 0-10 m of the water column and areas close to the spill source. The AMPs are located within various water depths (i.e., 80-120 m for Apollo; 50-70m for Beagle; 40-80 m for Boags; 40-150 m for Franklin, and 50-3,000 m for Zeehan, respectively) therefore, any benthic conservation values within these AMPs, such as ecosystems, habitats and sea-floor features are not predicted to be impacted. Impact to these receptors from direct or indirect exposure to in-water hydrocarbons may cause a subsequent negative impact to the value of the AMPs. Refer also to: • Plankton • Fish • Seabirds • Pinnipeds • Cetaceans • First Nations
Predicted Level of Impact	
Visible surface hydrocarbons can impact the aesthetic value and discourage any tourism of recreational activities that may occur within the AMPs. However, given the nature of the condensate, being light non-persistent hydrocarbon, any impacts are expected to be localised and short-term. Modelling predicted majority of the condensate, 70-82%, to evaporate within the first 24 hours, depending on the wind conditions (RPS, 2023). Therefore, low concentrations are anticipated to remain at the water surface. Furthermore, impacts from in-water hydrocarbons (dissolved and entrained) at the relevant thresholds are only anticipated to occur within the upper 0 – 10 m of the water column the surface layers of the water column, therefore, the majority of the values of the AMPs below the 10 m are not anticipated to experience significant impacts. Consequently, the potential consequence to these AMPs are considered to be **Moderate (2)**, as they could be expected to result in minor, short-term damage to an area of recognised conservation value.	

Key Ecological Features

Key Ecological Features	
Predicted Hydrocarbon Exposure	✓ **Surface** ✓ **In-water** ✗ **Shoreline**
Relevant Exposure Thresholds	**Surface: Low Exposure Threshold** **In-water: Moderate Exposure Threshold (Dissolved) and High Exposure Threshold (Entrained)**
Condensate	**MDO**
Modelling predicted three KEFs to be intersected by surface or in-water hydrocarbons at the relevant thresholds following a LOWC of condensate, including: • Bonney Coast Upwelling (approximately <5% overlap) • Upwelling East of Eden (approximately <5% overlap) • West Tasmania Canyons (approximately <50% overlap) The major conservation values for these KEFs have been identified within Section 6.2.15 of the EP (i.e. regions of high productivity, unique seafloor geology, seasonal upwelling,) which may be impacted by exposure to surface and in-water hydrocarbons at relevant thresholds. Any values which occupy the water column, specifically within the upper 0 – 10 m of the water column the surface layers of the water column (where in-water hydrocarbon exposure at relevant exposure thresholds is predicted), are more susceptible to entrained and dissolved hydrocarbons. The modelling predicted a maximum distance of 307 km for surface hydrocarbons at, or above, the low threshold for the worst-case scenario (RPS, 2023), therefore, any values that utilise the water surface of the marine environment may also be impacted.	Modelling predicted one KEFs to be intersected by surface or in-water hydrocarbons at the relevant thresholds following a vessel LOC MDO: • West Tasmania Canyons (approximately less than 15% overlap) The modelling predicted a maximum distance of 57 km for surface hydrocarbons at, or above, the low threshold for the worst-case scenario (RPS, 2023) The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS 2023).
Predicted Environmental Impact	
Surface	**In-water**
The values identified within the KEFs have the potential to be exposed to surface hydrocarbons at, or above, the low threshold, in the event of a spill incident. Impact to these receptors from direct or indirect exposure to surface hydrocarbons may cause a subsequent negative impact to the value of the KEFs. Refer also to:	The values identified within these KEFs have the potential to be exposed to entrained hydrocarbons at, or above, the low threshold. However, the exposure of entrained hydrocarbons will be greatest within the upper 0-10 m of the water column and areas close to the spill source. Therefore, the spill is unlikely to intersect with majority of the values of the KEFs which are concentrated within the water column >10 m deep or along the seafloor at varying water depths.

Key Ecological Features	
• Birds	Hydrocarbon exposure to the key receptors of the KEFs (e.g. seabirds, pinnipeds and cetaceans) may cause a subsequent negative impact to the value of the KEFs, however is expected to be limited to a small number of individuals, with no impacts to regional populations. Refer also to: • Soft Corals • Plankton • Fish • Birds • Marine Invertebrate • Cetaceans

Predicted Level of Impact

Hydrocarbons at, or above, low thresholds may cause impacts to receptors (i.e. seabirds) within the area impacted. However, modelling predicted majority of the condensate (70-82%) to evaporate within the first 24 hours, depending on the wind conditions (RPS, 2023). Therefore, low concentrations are anticipated to remain at the water surface.

Furthermore, impacts from in-water hydrocarbons (dissolved and entrained) at the relevant thresholds are only anticipated to occur within the upper 0 – 10 m of the water column the surface layers of the water column. As majority of the values of the KEFs are within the water column below the 10 m, the values of the KEFs are not anticipated to be impact.

Modelling predicted the highest probability of exposure to surface and or in-water hydrocarbons at relevant thresholds to occur at the West Tasmania Canyons KEF. The dominant feature of the KEFs are associated with the seafloor geology, of eight submarine canyons off the coast of Tasmania, which influence currents. Majority of the values are on the seafloor, therefore, are unlikely to be impacted by in-water hydrocarbons at the relevant thresholds.

However, plankton populations which are associated with the nutrient-rich waters brought by the currents influenced by the unique seafloor geology may be impacted by in-water hydrocarbon exposure at the relevant thresholds (refer also to Plankton).

Consequently, the potential consequence to these KEFs are considered to be Moderate (2), as they could be expected to result in minor, short-term damage to an area of recognised conservation value.

7.12.5.4 Socio-economic Environment

Coastal Settlements

Coastal Settlements			
Predicted Hydrocarbon Exposure	✘ **Surface**	✘ **In-water**	✓ **Shoreline**
Relevant Exposure Thresholds			**Shoreline: Low Exposure Threshold**
Condensate		**MDO**	
There are several sub local government areas (Sub-LGAs) identified as potentially being impacted from shoreline hydrocarbon exposure at the low threshold following a LOWC of condensate (RPS, 2023), those with the highest probability of shoreline loading included: • Cape Otway West (96%), • Apollo Bay (89%), • Moonlight Head (86%), • Cape Patton (69%), • Cape Liptrap (NW) (34%), and • Lorne (31%). Based on the worst-case scenario modelled, the minimum time for shoreline accumulation to reach a shoreline at the relevant threshold is 4 days (Colac Otway, Corangamite, Cape Otway West, Apollo Bay and Moonlight Head), with the maximum total volume of hydrocarbons ashore predicted as 193 m^3 (RPS, 2023).		There are several sub local government areas (Sub-LGAs) identified as potentially being impacted from shoreline hydrocarbon exposure at the low threshold following a LOWC of condensate (RPS, 2023), those with the highest probability of shoreline loading included: • Cape Otway West (18%), • Apollo (11%), • Moonlight Head (10%) • Cape Patton (8%) • Lorne (5%), and • Port Campbell (3%) Based on the worst-case scenario modelled, the minimum time for shoreline accumulation to reach a shoreline at the relevant threshold is 2 days (Colac Otway), with the maximum total volume of hydrocarbons ashore as 35 m^3 (RPS, 2023). The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS 2023).	
Predicted Environmental Impact			
Shoreline			
Visible hydrocarbons along the shorelines at these locations can change the aesthetic value. Furthermore, closure of these shorelines may impact public use and public activities. However, given the nature of the condensate, being light non-persistent hydrocarbon, any impacts to coastal settlements are expected to be localised and short-term. The wave and tidal action, together with predicted weathering, indicates that hydrocarbons along shorelines will continually wash off the substrates, and be readily flushed into the water, leading to further weathering.			
Predicted Level of Impact			

Coastal Settlements
Based on the worst-case scenario modelled that was shown to overlap local government areas (LGAs) at, or above, the low level (10 g/m^2) threshold, the minimum time for shoreline accumulation to reach a shoreline is 4 days (Cape Otway West, Apollo Bay and Moonlight Head) up to 24 days (Lorne), with the longest minimum time being 95 days (Port Fairy). However, due to the anticipated hydrocarbon weathering and fate of the condensate, majority is expected to have either evaporated or entrained during that time. Modelling predicted between approximately 70-82% of the volume to evaporate and between 0-22% to entrain within the first 24 hours, depending on the wind conditions (RPS, 2023). Furthermore, tidal and wave action within the area is anticipated to breakdown any shoreline hydrocarbons. Consequently, any impacts have been ranked as **Minor (1),** as they are anticipated to be localised low-level, short-term and recoverable impacts.

Other Marine Users

Other Marine Users	
Predicted Hydrocarbon Exposure	✓ **Surface** ✓ **In-water** ✗ **Shoreline**
Relevant Exposure Thresholds	**Surface: High Exposure Threshold** **In-water: Low Exposure Threshold (Dissolved) and Low Exposure Threshold (Entrained)**
Condensate	**MDO**
Surface hydrocarbons may interact with other marine users, such as offshore petroleum industry, defence, and shipping, present within the area exposed to hydrocarbons at the relevant thresholds following a LOWC of condensate (see Sections 6.5.1to 6.5.5 for further details). The modelling predicted a maximum distance of 1 km (Otway) to 17 km (Bas)s for surface hydrocarbons at, or above, the high threshold for the worst-case scenario (RPS 2023). In-water hydrocarbons at or above the low exposure threshold could require the Victorian Desalination Plant to shut their intakes.	Surface hydrocarbons may interact with other marine users, such as offshore petroleum industry, defence, and shipping, present within the area exposed to hydrocarbons at the relevant thresholds following a vessel LOC of MDO (see Sections 6.5.1to 6.5.5 for further details). The modelling predicted a maximum distance of 8 km (Otway) to 11 km (Bass) for surface hydrocarbons at, or above, the high threshold for the worst-case scenario (RPS 2023). The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS 2023).
Predicted Environmental Impact	
Surface	**In-water**
Hydrocarbons at the high threshold may result in oiling of vessel hulls and exclusion of the area until the hydrocarbons evaporation and entrain.	In-water hydrocarbons at or above the low exposure threshold could require the Victorian Desalination Plant to shut their intakes.
Predicted Level of Impact	
Physical displacement of vessel marine users may occur due to the establishment of exclusion zones following a spill incident. Due to the nature of the condensate, being a light non-persistent hydrocarbon, with high anticipated evaporation and entrainment rates, exclusion zones are not expected to be long-term and are unlikely to result in significant impacts to other vessel based marine users who may be required to avoid the area. No impacts to subsea cables are predicted from in-water hydrocarbons. In-water hydrocarbons at or above the low exposure thresholds at the Bass Coast where the Victorian Desalination Plant intake is located are only predicted for a LOWC of condensate for a spill in the Vic/P43. Dissolved hydrocarbons at the Bass Coast are predicted at the low exposure threshold (1% probability) and the moderate exposure threshold (1%) in summer) and at the low exposure threshold (4% probability) in winter. The minimum time before dissolved hydrocarbon exposure at the low threshold is 40 days and the maximum residence time is <1 day. In-water hydrocarbons at the Bass Coast are not predicted at the high exposure threshold and are only predicted at the low exposure	

Other Marine Users
threshold in winter (2% probability) The minimum time before entrained hydrocarbon exposure at the low threshold is 54 days and the maximum residence time is <1 day. Thus, in-water hydrocarbons at the low exposure threshold that could potentially require the desalination plant to shut in the intake would occur for < 1 day. Impacts to other vessel based marine users and the desalination plan have been ranked as **Minor (1),** as they are anticipated to be localised low-level, short-term and recoverable.

Recreation and Tourism

Recreation and Tourism	
Predicted Hydrocarbon Exposure	✓ **Surface** ✗ **In-water** ✓ **Shoreline**
Relevant Exposure Thresholds	**Surface: Low Exposure Threshold** **Shoreline: Low Exposure Threshold**
Condensate	**MDO**
The areas identified as potentially being overlapped by surface and shoreline hydrocarbons at the relevant exposure thresholds following a LOWC of condensate provide areas for a diverse range of tourism and recreational activities, such as: scuba diving, fishing, marine fauna watching, sailing (see Sections 6.5.6 to 6.5.8 for further details). The modelling predicted a maximum distance of 307 km for surface hydrocarbons at, or above, the low threshold for the worst-case scenario (RPS 2023). The minimum time for shoreline accumulation to reach a shoreline based on the worst-case scenario modelled is 4 days (Colac Otway, Corangamite, Cape Otway West, Apollo Bay and Moonlight Head) up to 24 days (Lorne) (RPS, 2023).	The areas identified as potentially being overlapped by surface and shoreline hydrocarbons at the relevant exposure thresholds following a vessel LOC of MDO provide areas for a diverse range of tourism and recreational activities, such as: scuba diving, fishing, marine fauna watching, sailing (see Sections 6.5.6 to 6.5.8 for further details). The modelling predicted a maximum distance of 57 km for surface hydrocarbons at, or above, the low threshold for the worst-case scenario (RPS, 2023). The minimum time for shoreline accumulation to reach a shoreline based on the worst-case scenario modelled is 2 days (Colac Otway), and up to 20 days (King Island) (RPS, 2023). The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS 2023).
Predicted Environmental Impact	
Surface	**Shoreline**
Visible surface hydrocarbons (i.e. a rainbow sheen) have the potential to reduce the visual amenity of the area for tourism and discourage recreational activities. Recreation is also linked to the presence of marine fauna and direct impacts to marine fauna such as whales, birds, and pinnipeds can result in indirect impacts to recreational values. It is important to note that the impact from a public perception perspective may be even more conservative. This may deter tourists and locals from undertaking recreational activities. If this occurs, the attraction is temporarily closed, economic losses to the business are likely to eventuate. The extent of these losses would be dependent on how long the attraction remains closed.	Visible hydrocarbons stranded on shorelines have the potential to reduce the visual amenity of the area for tourism and discourage recreational activities. In general, recreational and tourism activities are restricted to shallower coastal waters and shorelines. Precautionary exclusion from shorelines may be implemented by local governments until water quality monitoring verifies the absence of residual hydrocarbons. This could cause disruption to some recreational and tourism activities within that area. Furthermore, visible hydrocarbons along shorelines may impact the aesthetic value for tourism and discourage recreational activities that may be operating within the area

Recreation and Tourism
Refer also to: • Fish and sharks • Seabirds and Shorebirds • Pinnipeds • Cetaceans (whales and dolphins) • Marine invertebrates
Predicted Level of Impact
Any impact to receptors that provide nature-based tourism features (e.g. cetaceans, seabirds) may cause a subsequent negative impact to recreation and tourism activities. However, socio-economic impacts, such a reduction in the visual amenity of the area, are more likely to occur at low exposure thresholds. Visible hydrocarbons along the shorelines at these located can change the aesthetic value and discourage any tourism of recreational activities that may occur within the area. However, given the nature of the condensate, being light non-persistent hydrocarbon, any impacts to coastal settlements are expected to be localised and short-term. The wave and tidal action, together with predicted weathering, indicates that hydrocarbons along shorelines will continually wash off the substrates, and be readily flushed into the water, leading to further weathering. Consequently, any impacts are anticipated to be short-term and localised, and potential impacts have been ranked as **Moderate (2)**.

Commercial Fisheries

Commercial Fisheries		
Predicted Hydrocarbon Exposure	✓ **Surface** ✓ **In-water** ✗ **Shoreline**	
Relevant Exposure Thresholds	**Surface: Low Exposure Threshold** **In-water: Moderate Exposure Threshold (Dissolved) and High Exposure Threshold (Entrained)**	
Condensate	**MDO**	
Several commercial fisheries, including Commonwealth and State managed fisheries, may be intersected by surface or in-water hydrocarbons at the relevant thresholds following a LOWC of condensate (see Sections 6.5.9 to 6.5.13 for further details). Furthermore, the Australia seaweed industry was identified be present within areas where in-water hydrocarbons at the relevant thresholds may occur (see Section 6.5.14 for further details). The modelling predicted at, or above, moderate exposure thresholds for dissolved and high exposure thresholds for entrained in-water hydrocarbons for both Victorian and Tasmanian state waters for the worst-case scenario modelled (RPS, 2023). Noting that in-water exposure (dissolved or entrained) is only predicted to occur within the upper 0 -10 m of the water column. The shallow waters of King Island (a location where seaweed collectors harvest bull kelp) was the only nearshore areas predicted to be exposed to high exposure levels of dissolved and entrained in-water hydrocarbons for the worst-case scenario modelled (RPS, 2023). The modelling predicted a maximum distance of 307 km for surface hydrocarbons at, or above, the low threshold for the worst-case scenario (RPS, 2023).	Several commercial fisheries, including Commonwealth and State managed fisheries, may be intersected by surface or in-water hydrocarbons at the relevant thresholds following a vessel LOC of MDO (see Sections 6.5.9 to 6.5.13 (for further details). Furthermore, the Australia seaweed industry was identified be present within areas where in-water hydrocarbons at the relevant thresholds may occur (see Section 6.5.14f or further details). The modelling only predicted at, or above, high exposure thresholds for entrained in-water hydrocarbons for both Victorian and Tasmanian state waters for the worst-case scenario modelled (RPS, 2023). Noting that in-water exposure (entrained) is only predicted to occur within the upper 0 -10 m of the water column. No impact from dissolved hydrocarbons at, or above the moderate hydrocarbon threshold was predicted for either Tasmania or Victoria (RPS, 2023). The shallow waters of King Island (a location where seaweed collectors harvest bull kelp) had very low (1%) probability of high exposure to levels of entrained in-water hydrocarbons for the worst-case scenario modelled (RPS, 2023). The modelling predicted a maximum distance of 57 km for surface hydrocarbons at, or above, the low threshold for the worst-case scenario (RPS, 2023). The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS 2023).	
Predicted Environmental Impact		
Surface	**In-water**	
Physical displacement of commercial fishers may occur due to the establishment of exclusion zones during the spill response.	As discussed in the relevant sections above (i.e. fish and invertebrates) exposure to in-water hydrocarbons has the potential to impacts species. Due to the sensitivity, a small number of juvenile fish, larvae, and planktonic organisms, may be impacted.	

Commercial Fisheries	
Visible surface hydrocarbons (i.e. a rainbow sheen) may have the potential to cause impact public perception of the industry, potentially causing a negative economic impact.	In-water hydrocarbon exposure may result in a reduction in commercially targeted marine species (i.e. fish and invertebrate species), subsequently resulting in impacts to commercial fishing productivity. Contamination of target species can cause economic impacts to the industry. Exposure of in-water hydrocarbons to commercially valuable marine plants, such as macroalgae, can cause smothering, resulting in fouling and asphyxiation (Blumer 1971; Cintron et al. 1981). Notably, hydrocarbon smothering can act as a physical barrier for the diffusion of CO_2 across cell walls to macroalgae (O'Brien & Dixon 1976). Any impacts to commercially valuable seaweed has to potential to results in a negative economic impacts to the industry. However, any acute impacts are expected to be limited to individuals and not expected to cause impacts at a population level. Furthermore, impacts are not expected to affect population viability or recruitment. Refer to: • Macroalgae • Invertebrates • Fish
Predicted Level of Impact	
In-water exposure (entrained and dissolved) at the relevant exposure thresholds is only predicted to occur within the upper 0 – 10 m of the water column; therefore, commercially valuable species, such as pelagic and benthic species, are less likely to experience impacts. Given the anticipated weathering on the condensate (modelling predicted between approximately 70-82% of the volume to evaporate and between 0-22% to entrain within the first 24 hours, depending on the wind conditions (RPS, 2023), any impact to macroalgae (i.e. commercially valuable seaweed) is not expected to result in long-term or irreversible damage. Impacts to King George whiting spawning and recruitment was raised by a stakeholder (Stakeholder ID 25165861) in relation to the Corner Inlet Fishery. However, exposure at the moderate thresholds of dissolved (50 ppb) and high thresholds of entrained (100 ppb) hydrocarbons are not predicted within Corner Inlet. Furthermore, due to the nature of the condensate, being a light non-persistent hydrocarbon, with high anticipated evaporation and entrainment rates, exclusion zones are not expected to be long-term and are unlikely to result in significant impacts. Consequently, any impacts are anticipated to be short-term and localised, and potential impacts have been ranked as **Moderate (2)**.	

7.12.5.5 First Nations

First Nations	
Predicted Hydrocarbon Exposure	✓ **Surface** ✓ **In-water** ✓ **Shoreline**
Relevant Exposure Thresholds	**Surface: Low Exposure Threshold** **In-water: Moderate Exposure Threshold (Dissolved) and High Exposure Threshold (Entrained)** **Shoreline: Low Exposure Threshold**
Condensate	**MDO**
First Nations cultural values and sensitivities may be present within the area exposed to surface, in-water and shoreline hydrocarbons at the relevant exposure thresholds following a LOWC. These include values related to marine fauna and benthic species such as seagrass and kelp as identified in 6.6.3. The modelling predicted low exposure thresholds of shoreline accumulation to intersect with the following IPAs within Tasmania: • Badger Island (west of Flinders Island), • Mount Chappell Island (west of Flinders Island) • Preminghana (within the North-western coastline of Tasmania) The modelling predicted a minimum time of 28 days for shoreline accumulation to occur along the West coast of Tasmania (i.e. Preminghana IPA), at, or above, the low exposure threshold, with a maximum volume of 22 m^3 expected ashore at this location (RPS 2023). A minimum time of 42 days for shoreline accumulation to occur along the Flinders Island (i.e. Badger Island and Mount Chappell Island IPA), at, or above, the low exposure threshold, with a maximum volume of 24 m^3 expected ashore at this location (RPS 2023). Though no shoreline accumulation at the moderate shoreline accumulation is predicted at the IPAs. Surface hydrocarbons at, or above, the low threshold may occur within Tasmanian State waters on the north west corner but are not predicted in other State waters (SA, NSW or Victoria) or King Island (RPS 2023). The extent of the modelled in-water hydrocarbons, moderate dissolved and high entrained, exposure thresholds may overlap areas where species that have cultural	First Nations cultural values and sensitivities may be present within the area exposed to surface, in-water and shoreline hydrocarbons at relevant thresholds following a vessel LOC of MDO. These include values related to marine fauna and benthic species such as seagrass and kelp as identified in 6.6.3. The modelling did not predict any surface at, or above, the low threshold in any State waters (RPS 2023). No IPAs along coastlines were predicted to be exposed to shoreline hydrocarbons at relevant thresholds (RPS 2023). The extent of the modelled in-water hydrocarbons, moderate dissolved and high entrained, exposure thresholds may overlap areas where species that have cultural value are present. This includes any BIAs . Noting that in-water exposure (dissolved or entrained) is only predicted to occur within the upper 0 -10 m of the water column. The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS 2023).

First Nations		
value are present. This includes any BIAs . Noting that in-water exposure (dissolved or entrained) is only predicted to occur within the upper 0 -10 m of the water column.		
Predicted Environmental Impact		
Surface	**In-water**	**Shoreline**
Visible surface hydrocarbons have the potential to reduce the visual amenity of culturally significant areas. The following First Nations cultural values and sensitivities identified in Section 6.6.3 may be present within the area exposed to surface hydrocarbons at relevant thresholds and are assessed in the relevant sections: • Birds – Section 7.12.5.2 • Whales and dolphins – Section 7.12.5.2 • Seals – Section 7.12.5.2	The following First Nations cultural values and sensitivities identified in Section 6.6.3 may be present within the area exposed to in-water hydrocarbons at relevant thresholds and are assessed in the relevant sections: • Kelp and seagrass – Section 7.12.5.1 • Birds – Section 7.12.5.2 • Abalone, bimbalas, mussels, oysters, pipis – Section 7.12.5.2 • Rock lobster and crabs – Section 7.12.5.2 • Fish and eels – Section 7.12.5.2 • Whales and dolphins – Section 7.12.5.2 • Seals – Section 7.12.5.2	Visible hydrocarbons along a shoreline have the potential to reduce the visual amenity of culturally significant areas. The following First Nations cultural values and sensitivities identified in Section 6.6.3 may be present within the area exposed to shoreline hydrocarbons at relevant thresholds and are assessed in the relevant sections: • Birds – Section 7.12.5.2 • Seals – Section 7.12.5.2
Predicted Level of Impact		
Impacts to onshore cultural heritage, relics, and artefacts are not predicted as anyone shoreline oil exposure would occur up to the high tide mark. Impacts to submerged cultural heritage and submerged cultural landscapes are not predicted as in-water oil exposure would only occur within a depth of 10 m from the surface. No impacts are predicted to Batemans Bay Marine Park at the relevant exposure thresholds. No impacts are predicted to Three sisters rocks and Deen Maar at the relevant exposure thresholds. The worst-case scenario modelled, predicted minimum time before shoreline accumulation at, or above, the low threshold of 28 days is for the along the West coast of Tasmania (RPS, 2023) where the Preminghana IPA. However, due to the anticipated hydrocarbon weathering and fate of the condensate, majority is expected to have either evaporated or entrained during that time. Modelling predicted between approximately 70-82% of the volume to evaporate and between 0-22% to entrain within the first 24 hours, depending on the wind conditions (RPS, 2023). Furthermore, tidal and wave action within the area is anticipated to further breakdown shoreline hydrocarbons. Consequently, any impacts are anticipated to be short-term and localised, and potential impacts have been ranked as **Moderate (2)**.		

7.12.6 Demonstration that Risk will be ALARP

ALARP decision context and justification	**ALARP Decision Context: Type B** Vessels have been used for activities within the Otway and Bass including drilling for over a decade with no major incident. Vessel activities are well regulated with associated control measures, well understood, and are implemented across the offshore industry. Drilling has been ongoing within the Otway and Basin for over a decade with no major incident. Drilling activities are highly regulated with associated control measures, well understood, and are implemented across the offshore industry. However, if a loss of containment occurred this could attract public and media interest. Consequently, Beach believes that ALARP Decision Context B should be applied.
Adopted Control Measures	**Source of good practice control measures**
CM01: Marine Assurance Process	The rig and vessels will meet relevant maritime laws and includes pre-commencement rig and vessel inspections of class certification requirements under the Navigation Act 2012 and associated Marine Orders, including but not limited to: • Marine Order 21: Safety and emergency arrangements gives effect to SOLAS regulations dealing with life-saving appliances and arrangements, safety of navigation and special measures to enhance maritime safety. • Marine Order 27: Safety of navigation and radio equipment gives effect to SOLAS regulations regarding radiocommunication and safety of navigation and provides for navigation safety measures and equipment and radio equipment requirements. • Marine Order 30: Prevention of collisions requires that onboard navigation, radar equipment, and lighting meets the International Rules for Preventing Collisions at Sea (COLREGs) and industry standards. • Marine Order 31: SOLAS and non-SOLAS certification details survey, maintenance, and certification requirements for vessel class. • Marine Order 70: Seafarer Certification details training and competency requirements.
	Rig and vessels will have Preventative Maintenance System that provides a status on the maintenance of equipment and detailed manufacturer's specification on maintenance procedures for: • Equipment detail as a control in this EP will be inspected to ensure effective operation. • Power generation and propulsion systems on the MODU and vessels will be inspected to ensure efficient operation.
	Materials and equipment that have the potential to spill onto the deck or marine environment will be stored within a contained area.
	In accordance with MARPOL Annex I and Marine Order 91 Marine Pollution Prevention – oil, a Shipboard Marine Pollution Emergency Plan (SMPEP) or Shipboard Oil Pollution Emergency Plan (SOPEP) (according to class) is required to be developed based upon the Guidelines for the Development of Shipboard Oil Pollution Emergency Plans, adopted by IMO as Resolution MEPC.54(32) and approved by AMSA. To prepare for a spill event, the SMPEP/SOPEP details: • Response equipment available to control a spill event. • Review cycle to ensure that the SMPEP/SOPEP is kept up to date. • Testing requirements, including the frequency and nature of these tests. In the event of a spill, the SMPEP/SOPEP details: • Reporting requirements and a list of authorities to be contacted. • Activities to be undertaken to control the discharge of hydrocarbon.

	• Procedures for coordinating with local officials. In addition, spill response kits will be available and routinely checked to ensure adequate stock is maintained.
CM02: Vessel and Rig Operating Procedures	A 500 m radius Petroleum Safety Zone (PSZ) will be published in the Government Notices Gazette for each new well location for the duration of the drilling and will remain in place for those wells which are suspended for future production. A 2 km radius cautionary zone will be in place around the rig when on location and will be monitored by a support vessel. At least one support vessel will accompany the rig when in operation and when safe to do so (e.g. outside of weather event), to manage interactions with other marine users.
	Bunkering and bulk liquids will be transferred in accordance with bulk transfer procedures to reduce the risk of an unintentional release to sea during transfer. The procedures include standards for: • Certified equipment with confirmed integrity (e.g. hose and valves). • Transfer process (e.g. safety, communication, monitoring, inventory, emergency shut down procedures, procedural documents, and spill incident details)
CM03: Consultation for Implementation of EP	As per Section 4.16 Beach will undertake consultation for the implementation of the EP which will include at a minimum: • Notification to all relevant person regarding acceptance of the EP by NOPSEMA. • Commencement of activities, exclusion zones, vessel details, pre-lay of anchors and buoys, movement of drilling rig to new locations, during activity and cessation notification requirements. • On-water communication processes, including SMS messages and radio communication. • Consultation with relevant First Nations groups (section 6.6.2) regarding identified cultural heritage and cultural landscapes in accordance with CM05: Seabed Survey. • Consultation with commercial fishing associations (and individual commercial fishers where identified) regarding well locations, the ongoing communication of Beach activities to their members, and applying CM04: Beach Fair Ocean Access Procedure. Under the Navigation Act 2012, the Australian Hydrographic Office (AHO) are responsible for maintaining and disseminating hydrographic and other nautical information and nautical publications such as Notices to Mariners. AMSA also issue radio-navigation warnings. Notifications to AMSA and AHO will be undertaken as detailed in Section4.16.
CM04: Beach Fair Ocean Access Procedure	Beach's Fair Ocean Access Procedure was developed with input from commercial fishing industry organisations (Bass Strait Scallop Industry Association, Scallop Fisherman's Association of Tasmania, South East Trawl Fishing Industry Association and Tasmanian Seafood Industry Council. The procedure details the process whereby a commercial fisher can claim compensation for an economic loss associated with Beach's offshore activities where impacts cannot be avoided. An information sheet on the procedure is available in Appendix D.
CM09: Drilling Program	The BOP shall be routinely function and pressure tested in accordance with industry standards and preventative maintenance will be in accordance with manufacturer's specifications and in alignment with Drilling Contractors preventative maintenance system. Pre-operational function and pressure test to be conducted and may be witnessed by additional third-party prior to campaign.

	Prior to campaign commencement a register of suitable relief well rigs will be compiled and updated monthly during the campaign, or more frequently should any change in status of available rigs occur.
CM13: Beach Offshore Oil Pollution Emergency Plan	Under the OPGGS(E)R, NOPSEMA require that the petroleum activity have an accepted Oil Pollution Emergency Plan (OPEP) in place before the activity commences. In the event of a LOC or LOWC, the OPEP will be implemented. The Offshore OPEP was developed to support all Beach activities offshore Victoria and includes response arrangements for a worst-case LOC / LOWC scenario from the activity. The OPEP also includes Tactical Response Plans (TRPs) for identified protection priority areas within the region. The Victorian Desalination Plant is identified as a sensitive environmental receptor in the Offshore OPEP and forms part of the Powlett River Tactical Response Plan.
CM14: Beach Offshore Operational and Scientific Monitoring Plan	Under the Environment Regulation, NOPSEMA require that the Environment Plan Implementation Strategy provides for monitoring of an oil pollution emergency. The OSMP details operational monitoring to inform response planning and scientific monitoring to inform the extent of impacts from hydrocarbon exposure and potential remediation requirements.
CM15: Well Engineering and Construction Management System	Beach has in place an Operational Excellence Management System (OEMS) which consists of Well Engineering and Construction Management System (WECS) that ensures Beach well activities are fit for purpose with operational risks managed to a level that is as low as reasonably practicable. It also ensures that changes are made in a controlled manner, that appropriate standards are adhered to, and that a sufficiently resourced and competent organisation is in place.
CM16: Source Control Contingency Plan (SCCP), inclusive of Relief Well Plan	The SCCP will be consistent with the International Oil and Gas Producers (IOGP) Report 594 - Subsea Well Source Control Emergency Response Planning Guide for Subsea Wells (2019). Relief Well Plan will be developed in line with industry guidelines, i.e. UK Offshore Energies (OEUK). Beach is a signatory for accessing source control support through the Australian Energy producers Memorandum of Understanding (AEP MoU) arrangement. Mutual aid is a multi-lateral support network that provides a pre-agreed framework for the sharing of equipment and expertise. The key objective is to enable rapid response to control the source as efficiently as possible.
CM17: NOPSEMA Accepted Well Operations Management Plan	The Well Operations Management Plan (WOMP) details well barriers and the integrity testing that will be in place for the program. Beach's NOPSEMA-accepted WOMP describes the minimum requirements for well barriers during drilling activities.
CM18: NOPSEMA accepted Rig Safety Case	The Offshore Petroleum and Greenhouse Gas Storage (Safety) Regulations 2009 (OPGGS(S)) set out the requirements for the contents of safety cases. The rig requires an Australian Safety Case detailing the control in place to prevent a major accident event. The Rig Safety Case: • Identifies the hazards and risks. • Describes how the risks are controlled. • Describes the safety management system in place to ensure the controls are effectively and consistently applied.

Additional controls assessed			
Control	**Control Type**	**Cost/Benefit Analysis**	**Control Implemented?**
Preventative			

Eliminate or substitute the use of diesel.	Equipment	The use of diesel for fuel for vessels and machinery cannot be eliminated. Substituting for another fuel, i.e. Heavy Fuel Oil or bunker fuel oil, would have a higher environmental impact than diesel.	No
Remove support vessels from activity.	Equipment	Vessels are required to support operational activities and provide essential safety standby duties including tracking/intersecting vessels that are coming towards or close to the rig. Thus, there is an increased risk of collision by removing support vessels from the activity.	No
No refuelling to rig at sea.	Equipment	Eliminates the risk of incidents related to the transfer of fuels to the rig. Refuelling operations are one of the most likely causes of a hydrocarbon spill occurring during marine operations. However, given the offshore location and the inability to bring the rig into port to refuel, this activity cannot be removed.	No
Reduction			
Reduce the volume of MDO carried.	Equipment	May reduce the total volume of MDO released. Evaluation of trade-offs indicates that carrying less diesel would result in the need for more frequent port visits for refuelling and/or more frequent at-sea bunkering and may increase the risk of transit and bunkering related incidents. The trade-offs and associated costs are grossly disproportionate to the benefit gained.	No
Response			
Relief well rig on standby	Equipment	Any rig on standby would require an in-force Safety Case to operate in Australian Commonwealth waters. The key benefit would be a reduction in the overall shoreline loading from weathered, residual fractions of the condensate. The predicted maximum length of shoreline potentially impacted by low thresholds of hydrocarbon is between 105-138 km, with the average predicted being between 11-73 km. There is no predicted shoreline exposure at moderate or high thresholds. Having a rig on standby would potentially halve the time to implement source control, therefore, the overall potential reduction in exposure to shorelines by halve. Halving the potential loading at a low threshold would produce a marginal overall environment benefit given the nature of weathered condensate. Although conceptual relief well planning will be performed as part of the SCCP, time would	No

		still be required to plan the relief well to address the actual situation. Rig availability will be a challenge and on top of this, having a relief well rig on standby would result in significant additional costs (approx. $1M / day) to Beach that that are considered grossly disproportionate to the level of environmental benefit gained given the relatively small level of potential low threshold shoreline oiling.	
Capping Stack System (CCS)	Equipment	Well CCS is designed to stem the hydrocarbon flow prior to permanent plugging of the well. Beach undertook a feasibility review of CCS and has confirmed that due to the technical complexity (i.e. lack of vertical access above the well in a blowout scenario, significant HSE risks in deploying the capping stack and any Offset Installation methods due to no vertical access) of deploying a capping stack in shallow waters with a gas plume environment and harsh metocean conditions, a relief well is the preferred means of primary source control for the exploration, appraisal, and development wells. Refer to Section 7.13.1 Response Option Selection.	No
Emergency Shut In Device - Kinetic Blowout Stopper (K-BOS)	Equipment	K-BOS is a single use pyrotechnic device with rams which relies on condition-based monitoring to verify availability during operations. This is a new-to-Beach technology which has not been deployed in Australia and which has been deployed limited times internationally for subsea applications and not in the configuration required by Beach. To date, the device has never been activated to control a subsea loss of containment. The system has been tested to shear drill collars, heavy-walled casing, landing string etc. Whilst Beach understands from the supplier that the classification of the technology as a sealing barrier has undergone a validation process acceptable to DnV, Beach is not aware that NOPSEMA has yet given its formal acceptance for the use of this device in Australia, and (in any event) the device has not addressed Beach technical requirements with respect to sealing capability for the project. An assessment of this system is provided in Section 7.13.1 Response Option Selection.	No
Dispersant application	Equipment	Chemical dispersants are generally ineffective for gas-condensate hydrocarbon releases. However, dispersants may be effective to reduce VOCs at surface to below lower explosive limits. Given the installation of a	No

	capping stack is not a feasible response option for the production or suspended wells, and a relief well would be offset to the release location, there is no potential benefit with applying subsea dispersants.
Consequence rating	Moderate (2)
Likelihood of occurrence	LOC MDO: Highly Unlikely (2) based upon AMSA Annual Report 2017-18 (serious incident reports) LOWC condensate: Remote (1) (1.6 x 10^{-4} for drilling of a normal deep exploration wells and a probability of 1.5 x 10^{-4} for drilling of appraisal wells based upon gas wells operated to North Sea Standard) ref IOGP Risk Assessment Data Directory Blowout Frequencies September 2019: https://www.iogp.org/bookstore/product/risk-assessment-data-directory-blowout-frequencies/
Residual risk	Medium

7.12.7 Demonstration that Risks will be Acceptable

Consequence rating	Moderate (2)
Likelihood of occurrence	Highly Unlikely (B)
Residual risk	Low
Acceptability assessment	
Acceptability Assessment	
To meet the principles of ESD	The risk of a hydrocarbon spill was assessed as Low, and the highest consequence assessed as Moderate (2) which is not considered as having the potential to result in serious or irreversible environmental damage. There is high confidence in the predicted level of risk as Beach has significant experience operating in the Otway and Bass based on their existing offshore developments and associated activities including the Beach Otway Drilling Campaign in 2021/2022.
Internal context	The proposed management of the risk is aligned with the Beach Environment Policy. Activities will be undertaken in accordance with the Implementation Strategy (Section 7).
External context	Stakeholder objections or claims have been assessed in relation to hydrocarbon spills and appropriate controls have been adopted as detailed in Section 7.12.6. King Island Council (Stakeholder ID 8388624) raised concerns about hydrocarbon release that may reach King Island causing harm to the commercial fishing sector and reputational damage to the island's brand. Beach explained spill risks and spill response approach and support agencies.
Other Requirements	• Vessel activities undertaken during the Drilling Program will adhere to relevant legislative requirements as detailed in the controls section. • Integrity of wells, pipeline and subsea equipment is managed as per the requirements of the in-force EP, safety cases and WOMPs required under the OPGGS(E)R and Offshore Petroleum and Greenhouse Gas Storage (Safety) Regulations and Offshore Petroleum and Greenhouse Gas Storage (Resource Management and Administration) Regulations 2011, respectively. • The South-east Commonwealth Marine Reserves Network Management Plan 2013-23 (Director of National Parks, 2013) identifies oil pollution associated with shipping, other vessels and offshore mining operations as a pressure or source of pressure on the conservation values of the South-east Marine Reserves Network. Apollo, Beagle, Boags, Franklin and Zeehan AMPs may be exposed to surface or in-water hydrocarbons at the low threshold. Impacts to these AMP major conservation

	values are assessed as short-term and recoverable based on the majority of the exposure being to dissolved hydrocarbons for a short period of time. Impacts to AMP major conservation values for ecosystems, habitats, communities and cultural and heritage sites are not predicted. • The following Conservation Advice / Recovery Plans identify pollution as a key threat: ◦ Recovery Plan for Marine Turtles in Australia (CoA 2017b), identified as acute chemical discharge (oil pollution). ◦ National Recovery Plan for the Australian Fairy Tern (*Sternula nereis nereis*) (CoA 2020b). ◦ National Recovery Plan for the Australian Painted Snipe (CoA 2022) identified as a deterioration of water quality. ◦ Conservation Advice *Calidris ferruginea* (curlew sandpiper) (DoE 2015f) identified as Habitat degradation/ modification (oil pollution). ◦ Conservation Advice for *Calidris acuminata* (sharp-tailed sandpiper) (DCCEEW 2024h) identified wetlands and intertidal habitats threatened by acute pollution (oil). ◦ Conservation Advice for *Arenaria interpres* (ruddy turnstone) (DCCEEW 2024i) identified wetlands and intertidal habitats threatened by acute pollution (oil). ◦ Conservation Advice for *Numenius madagascariensis* (eastern curlew) (DoE 2015e) identified as Habitat degradation/ modification (oil pollution). ◦ Conservation Advice for *Calidris tenuirostris* (great knot) (DCCEEW 2024f) identified wetlands and intertidal habitats threatened by acute pollution (oil). ◦ Conservation Advice for *Calidris canutus* (red knot) (DCCEEW 2024g) identified wetlands and intertidal habitats threatened by acute pollution (oil). ◦ National Recovery Plan for Albatrosses and Petrels 2022 (CoA 2022a). ◦ Wildlife Conservation Plan for Migratory Shorebirds – 2015 (DoE 2015b). ◦ Wildlife Conservation Plan for Seabirds (CoA 2020a). • These Conservation Advice and Recovery Plans identify the following conservation actions: ◦ Minimise chemical and terrestrial discharge. Controls have been identified and will be implemented to minimise the risk of minimise chemical discharges. ◦ Ensure spill risk strategies and response programs include management for turtles and their habitats, particularly in reference to 'slow to recover habitats', e.g. nesting habitat, seagrass meadows or coral reefs. No habitats for turtles are identified within the Planning Areas. OPEP and OSMP cover management of response to oiled turtles. ◦ Ensure appropriate oil-spill contingency plans are in place for the subspecies' breeding sites which are vulnerable to oil spills. OPEP and OSMP cover response strategies for management breeding sites vulnerable to oil spills. ◦ Implement measures to reduce adverse impacts of habitat degradation and/or modification. Controls have been identified and will be implemented to reduce adverse impacts of habitat degradation and/or modification.
Monitoring and reporting	Loss of containment resulting in a hydrocarbon spill is required to be reported as per Section 8.3.1. Impacts as a result of a loss of containment resulting in a hydrocarbon spill will be monitored and reported in accordance with the OSMP.
Acceptability outcome	**Acceptable**

7.13 Spill Response

This section presents the impact assessment for oil spill response strategies.

Beach has developed a regional Offshore Oil Pollution Emergency Plan (OPEP) which is the primary reference document and key control measure to be implemented in the highly unlikely event of a hydrocarbon release whilst undertaking the Drilling Program.

7.13.1 Response Strategy Selection

Spill response strategies are triggered in the event of a hydrocarbon spill. Not all response strategies are appropriate for every oil spill. Different oil types, spill locations, and volumes require different response strategies, or a combination of response strategies, to form an effective response.

Beach has undertaken a preliminary Net Environmental Benefit Analysis (NEBA) to identify response strategies that will result in the lowest overall impact and maximum protection, or recovery, of environment, socio-economic and cultural values. The NEBA process is undertaken at a strategic level (pre-spill) to identify pre-determined appropriate response strategies. In the event of a spill, an Operational NEBA is undertaken throughout the response, and implementation of specific response strategies is subject to the outcomes of the Operational NEBA.

Table 7-19 details the review undertaken of current oil spill response strategies and identifies the response strategies that are appropriate to unplanned loss of well containment (LOWC) of condensate and an unplanned vessel spill of MDO.

7.13.2 Spill Response Planning Area

Exposure values for oil spill modelling were used to approximate the spatial extent to inform the evaluation and planning for oil spill response and monitoring.

To identify the area where oil spill response strategies would be effective the following actionable hydrocarbon exposure thresholds based on the NOPSEMA Bulletin: Oil Spill Modelling (NOPSEMA 2019) were used:

- Surface moderate exposure (50 g/m^2).
- Shoreline moderate exposure (100 g/m^2).

The Spill Response Planning Area for diesel is in Figure 7-12 and for condensate in Figure 7-13.

No areas of actionable shoreline oil (>100 g/m^2) were identified outside of Victoria and Tasmania with the main areas being King Island and the Otway Coast.

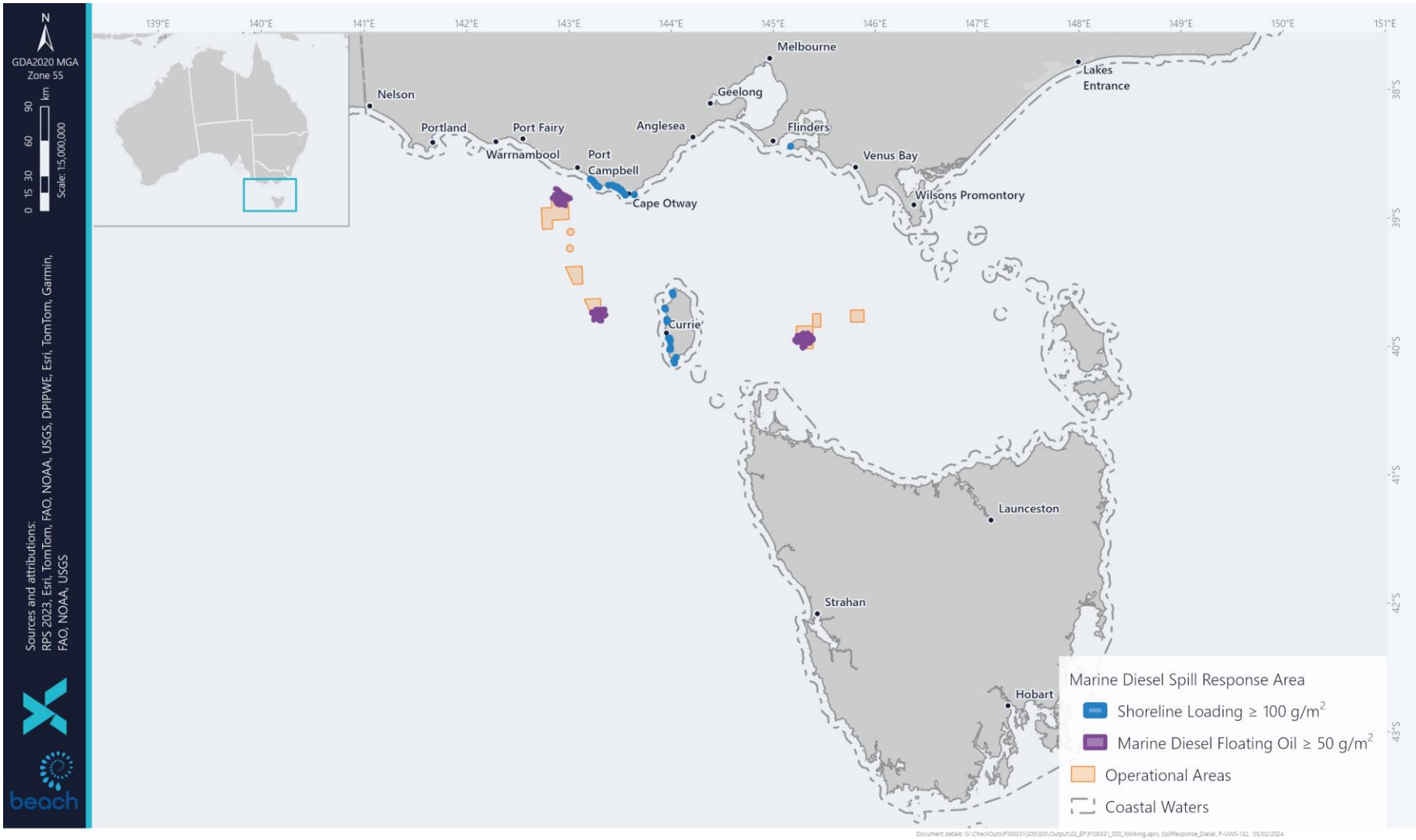

Figure 7-12: Diesel Oil Spill Response Area

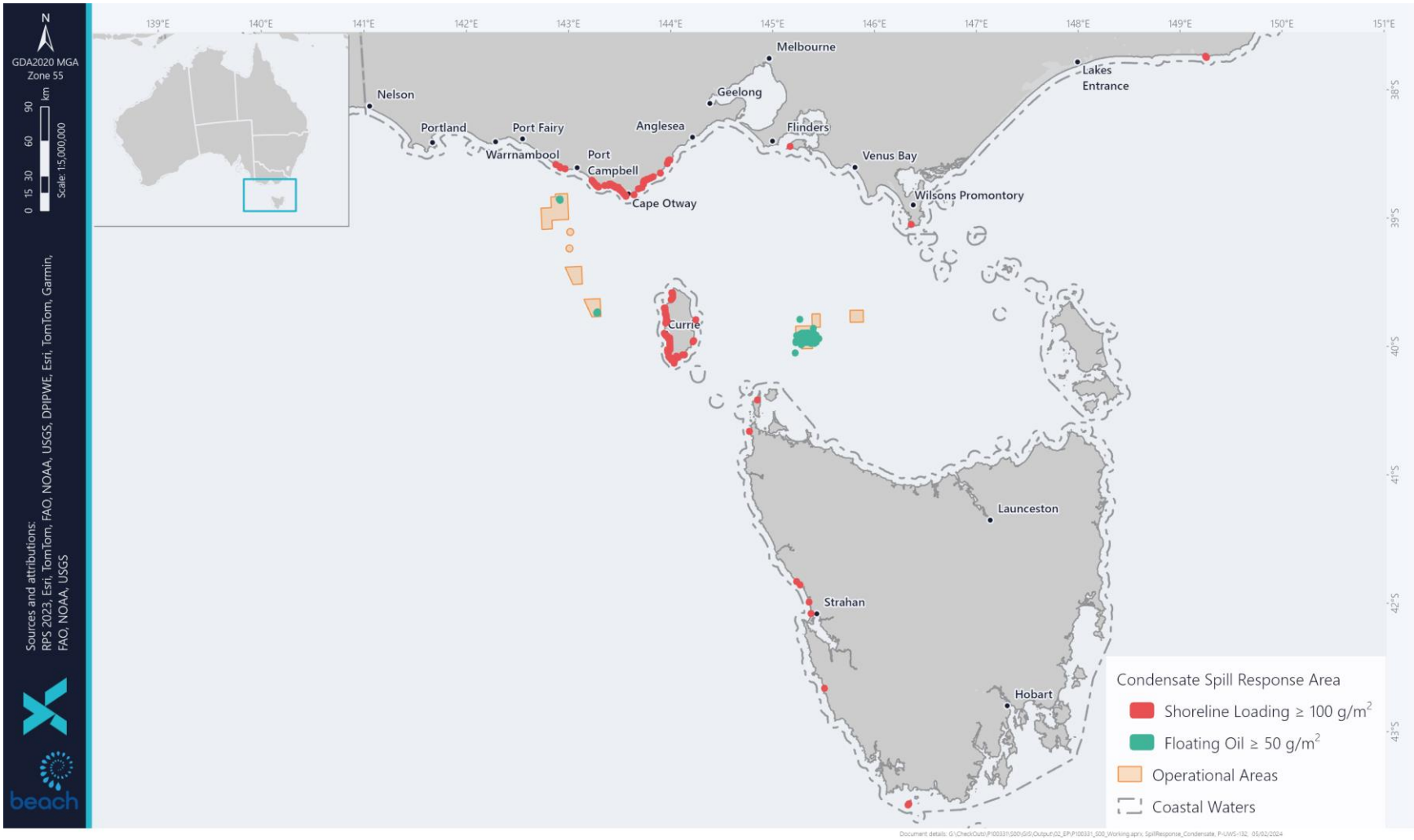

Figure 7-13: Condensate Oil Spill Response Area

Table 7-19: Preliminary NEBA Summary - Feasibility, Effectiveness & ALARP Analysis

Response Strategy	Response Description	Hydrocarbon Type	Feasibility, Effectiveness & ALARP Analysis	Net Environmental Benefit	Capability Needs Analysis (See OPEP and OSMP for details)	Capability Assessment
Monitor and Evaluate	Visual – aerial & vessel Satellite Predictive modelling	Gas condensate	Feasible. Effective – Gas condensate expected to spread to thin layers on the sea surface within 1 km of the well location. Monitoring used to inform both response planning and monitoring requirements. Hydrocarbons likely visible on sea surface for duration of LOWC. Visual and satellite operational monitoring implemented during LOWC event. Scientific monitoring implemented to inform extent of impact and remediation requirements. Aerial surveillance is considered more effective than vessel to inform spill response and identify if oil has contacted shoreline or wildlife. Vessel surveillance limited in effectiveness in determining spread of oil. All feasible monitoring techniques have been applied and monitoring personnel and equipment are readily available for deployment. Monitoring buoy maintained aboard rig whilst undertaking drilling activity for deployment. No further benefit gained by having additional monitoring capability. OSMP details the vessels and personnel to implement the appropriate scientific studies.	Yes	Actionable on-water hydrocarbon thresholds limited to immediate vicinity of well site. Maximum length of shoreline accumulation at the response threshold (moderate) is 44 km with a mean of 14 km. 1 x plane & observer required and/or 1 x vessel & observer and / or 5 x vessels and OSMP study teams. Remote oil spill trajectory modelling (OSTM).	As detailed in OPEP: • Tracking buoy on rig. • Aerial contracts in place • Aerial observers available via AMOSC. • Vessels available for duration of Drilling Program. • OSTM contract in place and available via AMOSC. • Environmental monitoring consultants accessible. Implement response as per OPEP and under direction of the State Control Agency (if in State waters). Capability in place and sufficient to implement timely response.
	Visual – aerial and vessel	MDO	Effective - MDO rapidly spreads to thin layers on surface waters. Monitoring used to inform both response planning and monitoring requirements. Aerial surveillance is considered more effective than vessel to inform spill response and identify if oil has contacted shoreline or wildlife. Vessel surveillance limited in effectiveness in determining spread of oil. Scientific monitoring implemented to inform extent of impact and remediation requirements. Both vessel and aerial monitoring capability in place. Trained aerial observers available via AMOSC Core Group and available for deployment. Vessel and aircraft contracts in place. No further benefit gained by having additional monitoring capability.	Yes		
Source Control	ROV Emergency BOP Intervention	Gas condensate	Feasible. Effective. Response strategy that can be rapidly implemented to reduce the release of hydrocarbons into the marine environment whilst undergoing plans for the primary response strategy of a relief well.	Yes	Support vessel Trained personnel Operating equipment (i.e. ROVs/cameras /cutters)	As detailed in OPEP and SCCP: • Access to response specialists such as AMOSC/ Oceaneering/Wild Well Control for equipment.
	Relief well	Gas condensate	At the time of writing, the following drilling rigs have been deemed as being within Australia in the expected time frame of the Drilling Program. • Ocean Apex (North West Shelf) • Noble Deliverer (Western Australia) • Transocean Endurance (North West Shelf) • Valaris 247 (North West Shelf) Due to the remote location of the Otway and Bass Basins, the available rigs shall be monitored on a monthly basis upon commencement of drilling activities thus ensuring the mobilisation of an alternate rig remains feasible within the assumed timeframe of approximately 35 days (the largest time component of the relief well kill). The ongoing assessment of rig availability shall be conducted with reference to: • Rig with a valid Australian Safety Case. • Rig with the ability to conduct relief well kill operations. • Rig ability to operate in shallow water.	Yes	Rig – with Australian Safety Case. Casing, drill pipe and consumables. 3 x Support vessels. Well control personnel as detailed in SCCP.	As detailed in OPEP, SCCP and Relief Well Plan: • Access to rig via AEP MoU. • Contracts with Well Control Specialists. • Relief well mobilisation strategy and schedule. • Wells Emergency Team (WET). Implement response as per OPEP, SCCP and Relief Well Plan. Capability in place and sufficient to implement timely response.

Response Strategy	Response Description	Hydrocarbon Type	Feasibility, Effectiveness & ALARP Analysis	Net Environmental Benefit	Capability Needs Analysis (See OPEP and OSMP for details)	Capability Assessment
			• Proximity to the Otway and Bass. • Ability to engage in a mutual aid agreement with the Operator. Transport of one of the identified rigs to the Otway or Bass Basin is within the 35-day mobilisation estimate provided, assuming a tow speed of ~4 knots. If there are suitable rigs operating in New Zealand within the expected timeframe of the Beach Drilling Program (at the time of writing, none are planned to be), the transport from New Zealand waters to the Otway or Bass Basins is likely to take approximately half of the duration relative to mobilisation from the North-West Shelf. Interface shall be managed via the Australian Energy Producers 'Memorandum of Understanding (AEP MoU): Mutual Assistance' (to which Beach is a signatory) between Beach Energy, the New Zealand Oil Operator, Rig Contractor, and the Australian Regulator. Source control planning has identified all reasonable controls to implement relief well in a timely manner. Beach considers the potential environmental benefit gained by having a pre-positioned alternate rig on location to be grossly disproportionate given the high financial and logistical support cost associated with having a rig on standby. All reasonable pre-planning has been undertaken to facilitate the timely initiation of a relief well if required.			
	Capping stack system (CSS)	Gas condensate	Trendsetter Engineering, as the manufacturer of capping stacks, was engaged by Beach to review various capping stack options and its feasibility. Trendsetter reviewed available concepts promoted within industry and selected the two most viable deployment concepts for further evaluation with the various CSS. The feasibility analyses are detailed in the following two studies: • Beach Energy Capping Stack Shallow Water Feasibility Assessment • GER-9002748_BE CS Non-Vertical Study Two (2) alternative offset installation (non-vertical access) methods were applied to four (4) different CSS identified by Beach Energy for potential use on a typical shallow water subsea blowout gas well. **Delmar Offset Installation Method** This method requires that the subsea blowout wellhead was left clear, with BOP stack removed previously or not installed at all, so that Delmar's subsea wellhead winches could be established for drawdown operations. For this concept, the subsea winch is the primary installation method, with the mudmat winch drawdown being the secondary installation method. The positioning of the capping stack is solely dependent on the use of the drawdown winches. The subsea hook up would need to be made with vessel support from outside the plume diameter, with adequate safety margin, estimated to be at least 335 m. Furthermore, vertical control is fully dependent on the positive buoyancy of the system, and successful deployment relies heavily on the precisely calculated buoyancy force of the chained buoys, with only minimum control or adjustable measures to compensate the required vertical lifting of the payloads. If the gas plume impact forecast to the buoys is not within the assumed design, then the buoyancy performance will be outside the calculated parameter range. **Trendsetter Offset Installation Method** The Trendsetter method relies on a series of chained oceangoing barges to assist in lifting and deployment of the CSS and BOP adaptor spool. The barges are used to assist positioning and ensure the anchor handling vessel is maintained in a safe zone away from	N/A	N/A	N/A

Response Strategy	Response Description	Hydrocarbon Type	Feasibility, Effectiveness & ALARP Analysis	Net Environmental Benefit	Capability Needs Analysis (See OPEP and OSMP for details)	Capability Assessment
			the gas plume. Gas plume impact on oceangoing barges in exclusion zone above blowout well will severely limit the success of the deployment. In addition, two subsea winches, may be deployed on clump weights on the seabed approximately 30 m from the wellhead and used for lowering and guidance of the capping stack over the damaged well. In general, the subsea drawdown system would be recommended with a less heavy 7" 15,000 psi capping stack (Boots and Coots) and to assist with successful guidance of the CSS assembly. Unlike the Delmar method that uses buoyancy modules, these are not required for the Trendsetter method. Furthermore, the use of the drawdown capability is dependent on the wet weight of the stack and the up-thrust forces from the blowout well. The Trendsetter method does require additional vessels available, and the successful deployment would be limited due to the weather and metocean conditions. **Summary** Rough sea states (especially as per prevailing in the Otway Basin), including high waves and longer wave periods define the safe operating limits of CSS deployment. The ability to safely deploy the capping stack using a deck crane or A-frame located on the stern of the deployment vessel is questionable. Furthermore, if the vessel is experiencing too much heave due to wave action, the CSS could unintentionally hit the subsea wellhead during deployment causing damage to the equipment itself and to the wellhead. Support vessels have wind ratings for routine and critical operations, above which, operations may be suspended, and high wind speeds will tend to increase wave heights in open water conditions which can further limit operations. Defining operating limits of acceptable sea states are required for successful deployment of the CCS equipment in adverse sea state environments. The feasibility analysis confirmed a sea state limit of 2 m significant wave height (Hs) and 15 knots winds is required. The Otway Basin is a predominant moderate to high wave energy environment with wave heights in the summer months average between 2.5 and 3.0 m and maximum heights range between 5.6 and 7.7. Wave conditions are more severe in winter, when mean heights range from 3.1 to 3.7 m and maximum heights are between 7.6 and 10.3 m. In summary, all seasons show a relatively high level of wind and wave activity. Winds in the eastern Otway and western Bass Strait area also are generally strong, exceeding 13 knots for 50% of the time. The sea state in the area does not stay below the limit for a duration long enough for the CCS operation. The conditions are thus not operationally suitable for deployment of the CSS. Furthermore, the gas plume environment in shallow water conditions is manifestly different to a deeper water environment due to the exclusion zone above the wellhead preventing vertical installation of the equipment. Additionally, given the use of a CSS is not operationally suitable for the Drilling Program, the debris clearance tooling as part of the SFRT is not required.			
	Subsea First Response Toolkit (SFRT)	Gas condensate	Feasible. Potentially effective - may support decision making for source control strategy, and potentially allow for debris clearance. Given that the use of a CSS is not operationally feasible, as described above, the use of the SFRT is not required.	NA	NA	NA
	Emergency Shut In Device - Kinetic Blowout Stopper (K-BOS)	Gas condensate	K-BOS is a single use pyrotechnic device with rams which rely on conditions-based monitoring to verify availability during operations. The seal components are installed into a hermetically sealed chamber that is not reopened until recertification or activation. The equipment is not routinely function tested or pressure tested, like a conventional subsea BOP, to confirm equipment condition and relies on being hermetically sealed during its lifetime.	NA	NA	NA

Response Strategy	Response Description	Hydrocarbon Type	Feasibility, Effectiveness & ALARP Analysis	Net Environmental Benefit	Capability Needs Analysis (See OPEP and OSMP for details)	Capability Assessment
			This is a new-to-Beach technology which has not been deployed in Australia and which has been deployed limited times internationally for subsea applications and not in the configuration required by Beach. The system has been tested to shear drill collars, heavy-walled casing, landing string etc. Whilst Beach understands from the supplier that the classification of the technology as a sealing barrier has undergone a validation process acceptable to DnV, Beach is not aware that NOPSEMA has yet given its formal acceptance for the use of this device in Australia, and (in any event) the device has not addressed Beach technical requirements for the project. DNV is the leading industry body to ensure that safety critical equipment and wells are designed, constructed, and maintained to manage the risk of unintentional fluid escapes. The Drilling Program wells will have the rig's subsea BOP installed on the wellhead prior to drilling into any hydrocarbon bearing sections. This is proven technology with built in redundancy in terms of sealing capability (multiple rams), shearing capability (multiple shear rams), control systems (mudline subsea control), emergency systems (emergency disconnect sequence, surface and subsea accumulator bottles, autoshear / Deadman system, acoustic control, ROV control panels on the lower marine riser package and BOP, portable emergency acoustic control). With the existing BOP stack in place including multiple redundant systems, the newness of the K-BOS technology and the lack of validation of the sealing system to function to its design intent, risks along with the additional costs and time, lack of actual subsea deployments and risk to system (well) integrity of untested safety critical equipment, means the trade-offs are considered grossly disproportionate to the unproven benefit of the K-BOS.			
	Vessel Source Control	MDO	Effective – primary response strategy for all spills in accordance with vessel SMPEP/SOPEP. Given AMSA is the Control Agency in the event of a vessel collision in Commonwealth waters, and their access to NatPlan resources not further controls are considered.	Yes	Support vessels	Drilling Program is serviced by multiple support vessels. Capability available at request of AMSA as Control Agency.
Offshore Containment and Recovery	Booms and skimmers	Gas condensate	Not feasible. Actionable surface thickness of 50 g/m^2 is expected in the vicinity of the release location (<1 km) for both seasons for the Otway wells. For the Bass wells Actionable surface thickness of 50 g/m^2 is up to 17 km with a residency times of only 3 days. In general, this method only recovers approximately 10-15% of total spill residue, creates significant levels of waste, requires significant manpower and suitable weather conditions (calm) to be deployed.	N/A	N/A	N/A
		MDO	Not feasible. MDO spreads rapidly to less than 10 g/m^2 and suitable thicknesses for recovery are only present for the first 36 hours for a large offshore spill, and there is insufficient mobilisation time to capture residues. In general, this method only recovers approximately 10-15% of total spill residue, creates significant levels of waste, requires significant manpower and suitable weather conditions (calm) to be deployed.			
Protection and Deflection	Nearshore Booms and skimmer	Gas condensate	Potentially feasible. Partially effective. The maximum length of actionable shoreline oil is approximately 44 km with initial shoreline contact predicted to occur within 5 days of the release with a maximum loading of 193 m^3 predicted. If operational monitoring indicates shorelines are potentially exposed to actionable levels of hydrocarbons and accessible to response personnel and equipment, protection and deflection may be an effective technique for reducing shoreline loadings.	Subject to operational NEBA	Response personnel Booms & skimmers Waste facilities	As detailed in OPEP: • Core responders and equipment available via AMOSC. • NRT and NRST available via Control Agency request under NatPlan. • Environmental monitoring providers accessible. • Waste contracts in place.

Response Strategy	Response Description	Hydrocarbon Type	Feasibility, Effectiveness & ALARP Analysis	Net Environmental Benefit	Capability Needs Analysis (See OPEP and OSMP for details)	Capability Assessment
			Given Beach have access to both AMOSC equipment and Core Group personnel available for timely deployment as per Tactical Response Plans, no further controls have been identified.			• Tactical Response Plans developed for priority response planning areas. Implement response as per OPEP and under direction of the State Control Agency. Capability in place and sufficient to implement timely response.
		MDO	Potentially feasible. Partially effective. The maximum length of actionable shoreline oil is approximately 10 km with initial shoreline contact predicted to occur within 2 days of the release with a maximum loading of 35 m^3 predicted. If operational monitoring indicates shorelines are potentially exposed to actionable levels of hydrocarbons and accessible to response personnel and equipment, protection and deflection may be an effective technique for reducing shoreline loadings. Given Beach have access to both AMOSC equipment and Core Group personnel available for timely deployment as per Tactical Response Plans, no further controls have been identified.	Subject to operational NEBA	Response personnel Booms & skimmers Waste facilities	As detailed in OPEP: • Core responders and equipment available via AMOSC. • NRT and NRST available via Control Agency request under NatPlan. • Environmental monitoring providers accessible. • Waste contracts in place. Implement response as per OPEP and under direction of the State Control Agency. Capability in place and sufficient to implement timely response.
Shoreline Clean-up	The active removal and/or treatment of oiled sand and debris	Gas condensate	Feasible. Effective on beaches. The maximum length of actionable shoreline oil is approximately 44 km with actionable shoreline oil contact predicted to occur within 9 days of the release with a maximum loading of 193 m^3 predicted. If operational monitoring indicates shorelines are potentially exposed to actionable levels of hydrocarbons and accessible to response personnel and equipment, shoreline clean-up may be an effective technique for reducing shoreline loadings. Given Beach have access to both AMOSC equipment and Core Group personnel available for timely deployment as per Tactical Response Plans, no further controls have been identified.	Subject to operational NEBA	For shoreline clean-up planning the volume of collected oil is multiple by a factor of 10. The clean-up rate is based on 1 m^3 per day per person with clean-up teams based on 10 persons per team.	As detailed in OPEP: • Core Group responders and equipment available via AMOSC. • NRT and NRST available via Control Agency request under NatPlan. • Waste contracts in place. • Tactical Response Plans developed for priority response planning areas. Implement response as per OPEP and under direction of the State Control Agency. Capability in place and sufficient to implement timely response.
		MDO	Feasible. Effective on beaches. The maximum length of actionable shoreline oil is approximately 10 km with actionable shoreline oil contact predicted to occur within 4 days of the release with a maximum loading of 35 m^3 predicted. If operational monitoring indicates shorelines are potentially exposed to actionable levels of hydrocarbons and accessible to response personnel and equipment, shoreline clean-up may be an effective technique for reducing shoreline loadings. Given Beach have access to both AMOSC equipment and Core Group personnel available for timely deployment as per Tactical Response Plans, no further controls have been identified.	Subject to operational NEBA	For shoreline clean-up planning the volume of collected oil is multiple by a factor of 10. The clean-up rate is based on 1 m^3 per day per person with clean-up teams based on 10 persons per team.	As detailed in OPEP: • Core Group responders and equipment available via AMOSC. • NRT and NRST available via Control Agency request under NatPlan. • Waste contracts in place. Implement response as per OPEP and under direction of the State Control Agency. Capability in place and sufficient to implement timely response.
Oiled Wildlife Response (OWR)	Capture, cleaning, and rehabilitation of oiled wildlife.	Gas condensate	Feasible. Effective. At the conservative environmental impact surface threshold (10 g/m^2) the predicted exposure is up to 20 km for the Otway wells and 88 km for Bass from the release location. Oiling could also occur on shorelines if fauna present.	Yes	Personnel Equipment Triage and waste facilities	As detailed in OPEP: • Core Group responders and equipment available via AMOSC • NRT and NRST available via Control Agency request under NatPlan. See OPEP for details of applicable response and support agencies for the relevant state.
		MDO	Feasible. Effective. At the conservative environmental impact surface threshold (10 g/m^2) the predicted exposure is up to 48 km from the release location with a maximum			

Response Strategy	Response Description	Hydrocarbon Type	Feasibility, Effectiveness & ALARP Analysis	Net Environmental Benefit	Capability Needs Analysis (See OPEP and OSMP for details)	Capability Assessment
			residency time of up to one day. Low numbers of exposed birds would be predicted based on exposure time. Oiling could also occur on shorelines if fauna present.			Capability in place and sufficient to implement timely response
Chemical Dispersant Application	Application of chemical dispersants either surface or subsea	Gas condensate	Feasible. Not recommended for Group I oils such as condensate due to the very low viscosity and high volatility – generally no environmental benefit gained by the application of dispersant on Group I oils. Subsea dispersant injection (SSDI) may reduce volatile organic compounds (VOCs) at sea surface within the response area, therefore creating a safer work environment for responders. Given the use of a CSS is not operationally suitable, the application of chemical dispersants to reduce surface VOCs is not required.	No	N/A	N/A
		MDO	Feasible. Although "conditional" for Group II oil, the size of potential spill volume and the natural tendency of spreading into very thin films is evidence that dispersant application will be an ineffective response. The dispersant droplets will penetrate through the thin oil layer and cause 'herding' of the oil which creates areas of clear water and should not be mistaken for successful dispersion (see ITOPF – Technical Information Paper No. 4: The Use of Chemical Dispersants to Treat Oil Spills).	No	N/A	N/A

7.13.3 Response Strategies

7.13.3.1 Source Control

Source control responses for consideration in this plan include:

- ROV Emergency BOP Intervention
- Relief Well
- Subsea First Response Toolkit
- Vessel Source Control

Refer to the well-specific Source Control Contingency Plan (SCCP) for the recommended source control strategies.

ROV Emergency BOP Intervention

Emergency BOP activation involves delivering hydraulic fluid to the BOP stack using an ROV to mitigate any problems that may have arisen with the BOP control system in the event of a loss of well containment.

Relief Well

Drilling a relief well is the primary source control strategy for wells in the Otway and Bass Basins. Each well, or group of similar wells, has a Relief Well Plan (CM16) detailing: the relief well strategy for each well or group of similar wells, anticipated timeframes to drill a relief well and resources available to implement the Relief Well Plan.

The primary method of well control is via a dynamic well kill by intersecting the well bore below the release location via a relief well and circulating kill weight drilling fluid into the well bore, thus controlling the flow of hydrocarbons from the reservoir. This requires the mobilisation of another suitable rig to the existing well location.

Relief Well Scope

The scope of drilling a relief well is the same as drilling a standard well although it will be a deviated well due to the need to drill at distance from the original flowing well. A relief well is typically drilled as a straight hole down to a planned kick-off point, where it is turned towards the target using directional drilling technology and tools to get within 30 - 60 m of the original well. The drilling assembly is then pulled from hole and a magnetic proximity ranging tool is run on wireline to determine the relative distance and bearing from the target well. Directional drilling continues with routine magnetic ranging checks to allow for the original well to be intersected. Once the target well is intersected dynamic kill commences by pumping kill weight mud and cement downhole to seal the original well bore.

Planning for the relief well will begin simultaneously with other well intervention options. Outline relief well plans, and methodology are contained in each well-specific Source Control Contingency Plan (SCCP) (CM16) The SCCP details the process for relief well design with key activities prioritised as part of the immediate response operations:

- Mobilisation of well control and relief well specialists.

- Confirmation of relief well strategy with well specialist to define rig/vessel requirements:
- Confirm relief well location using geophysical site survey data. This will consider the prevailing weather at the time of the incident, seabed infrastructure in the area and directional drilling requirements for well intersection.
- Validate relief well casing design.
- Screen available rigs in the region with current Australian Safety Case and select rig with appropriate technical specifications to execute the strategy. A memorandum of understanding has been established between Australian operators (including Beach Energy) to expediate access to suitable rigs, equipment, and services for relief well drilling. If required Beach is able to request the use of a rig, equipment, and services, that may be under contract to another operator. Minimum technical specifications for the well kill have been modelled, and the selected rig will meet these requirements and be capable of operating in the metocean conditions at the relief well location.
- Prepare and submit regulatory documentation required for relief well activities.
- Mobilise necessary equipment and services such as directional drilling equipment and appropriate ranging tools for relief well strategy.

Relief Well Design

The SCCP and Relief Well Plan (CM16) includes technical details as to the design and equipment requirements to drill a relief well. Detailed well kill modelling has demonstrated that the activity wells can be killed via a single relief well. Two relief well sites have been identified for each well location, even though modelling confirms only one relief well is required for the kill operation. This redundancy will give contingency in the event one of the relief well sites is deemed not accessible. Final sites will be chosen based on a risk assessment considering the actual conditions in the event of a loss of containment.

The relief well can be executed using a semi-submersible rig (moored) similar to that used for the Drilling Program. Moorings are expected to extend approximately 2 km from the rig and may therefore extend beyond the distance of the Operational Area, which may expand by approximately 1-2 km radius under emergency conditions. The final anchor layout will be based on mooring analysis and rig configuration.

At least two Anchor Handling Tug Supply (AHTS) vessels would be required to tow the rig (if unable to self-propel) and install moorings. An active rig would already be supported by AHTS vessels and hence would likely be accompanied by those vessels during relief well drilling. AHTS vessels could also be sourced from hubs such as the Northwest shelf and Singapore.

Rig Selection

The Otway and Bass Basins are considered remote locations and therefore likely to have an impact on the time taken for a suitable rig to be mobilised to the relief well location. This timeframe has been built into the oil spill modelling. Rig broker reports are used to monitor the rig market on a monthly basis and, if required, assist in sourcing and contracting a suitable rig:

- The rig broker can be contracted to identify and contract a suitably specified rig (including Australian Safety Case status) within 14 days. This allows sufficient time to engage with other operators as well as drilling contractors to confirm availability of drilling rigs with suitable technical specifications to meet the required engineering well design.

- To facilitate timely response, Beach is a signatory to the AEP Memorandum of Understanding: Mutual Assistance for transfer of drilling rigs between operators in the case of an emergency. A drilling rig that is not currently in operator, or in transit to the next operating well, will be preferential and result in a reduced period from the 14 days predicted for engaging and selecting suitable rigs. The full 14 days will be required where there are no suitable drilling rigs not currently in operation and the selected drilling rig will be required to safely suspend well operations on its existing well prior to commencing of mobilisation to Beach's location.

Rig selection for relief well drilling will be based on the following:

- A rig mobilised from the NWS or Singapore is likely to take 35 days. These periods have been factored into the relief well schedule within the well-specific Relief Well Plans.

- Rating of well control equipment: Rigs considered shall have equipment rated to at least 10,000 psi to perform the required well kill.

- Water depth: Rig being considered for relief well drilling must be rated for a minimum water depth of 60 m-100 m.

- Pump capacity of rig: Suitable to execute the dynamic well kill as per modelling.

- Seabed conditions.

- Rig with a valid Australian Safety Case.

- Proximity to the Otway and Bass Basins.

- Ability to engage in a mutual aid agreement with the operator.

Relief Well Installation Timeline

The relief well timeline is largely guided by the location of mobilisation of the rig drilling the relief well. The three mobilisation points considered are outlined previously. Beach anticipates the mobilisation of an alternate rig to the Otway and Bass basins and the successful intersection of a flowing well would take approximately 86 days. Details of the most suitable source control methods applicable to the specific wells will be detailed in well-specific Source Control Contingency Plan, inclusive of the Relief Well Plan and dynamic kill modelling.

Regulatory Approval Timing Considerations

Planning for relief well drilling will occur in parallel to other tertiary well control responses. A key component of the relief well drilling will be the preparation, submission, and approval of the regulatory documents. Generally, for well operations the regulatory and risk management processes fall on critical path hence in an emergency these documents will require a high level of focus immediately to ensure they are in place prior to arrival of the rig.

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The following documents will require consideration:

- Vessel Safety Case – is required for the selected rig.
- Scope of validation - is required by NOPSEMA for any proposed significant change to an offshore facility (i.e. rig or vessel) and to be agreed prior to submission of a safety case revision. Depending on the level of changes the time to complete and gain approval could possibly affect the response time to have regulatory documentation in place prior to start of relief well operations.
- Safety Case Revision - will require preparation, submission and approval prior to operations and is expected to be on critical path for relief well activities.
- Well Operations Management Plan (WOMP) –is expected to be suitable for relief well drilling and not expected to require a revision and resubmitted.
- Environmental Plan (EP) – Is designed to provide for source control response activities. Significant changes may require resubmission subject to initial change assessment, though is not expected to affect overall response time.
- Well Activity Notice (WAN) - As part of the preparation of the above documentation a number of formal safety assessments will be conducted as part of risk management these include:
    - Hazard Identification (HAZID) workshop (identity's risks, assesses hazards and mitigations to control works site hazards with aim to remove major accident events).
    - Hazard Operations (HAZOP) workshop (risk assesses the operational sequence and place controls to reduce hazards to ALARP).
    - Risk Assessments for safety critical equipment (vessel equipment, BOP, mooring, fluids handling).

Response Agreements:

Beach maintains contracts/agreements with specialists to supply well control expertise and support for drilling a relief well. This includes:

- Well engineering support services such as Wild Well Control.
- Technical writing and risk engineering services to support regulatory documentation workflows and submissions is provided by experienced specialists such as ADD Energy.
- Wild Well Control: Well control specialists with experience in relief wells and the coordination of installation activities.
- Wellhead and casing materials supplier.
- Beach is party to the Industry Memorandum of Understanding (MoU) to share drilling rigs, equipment and resources (well site services) in the event of an emergency. The MoU provides for

the timely transfer of third-party contractual arrangements involved in the release of a rig and well site services to the Titleholder for relief well drilling.

- Equipment and materials needed to construct a relief well will be able to be sourced either directly from suppliers or through the industry AEP Mutual Aid MoU. All equipment and materials are tracked and identified prior to the commencement of the offshore activity through the "relief well readiness form" process (refer to OPEP). All equipment and materials are expected to be sourced and transported to site during the safety case revision approval timeframe, rig transit and anchoring phase for the base and mid case response time model estimates. For the local rig mobilisation case, an operational rig would also have equipment and services, with additional equipment and services available via AEP MoU.

- Beach will conduct a relief well readiness check and engage titleholders to ascertain and confirm the level of critical equipment inventories during the operational period for the purpose of drilling a relief well.

Vessel Source Control

For a vessel spill at sea, the Vessel Master shall implement the Shipboard Marine Pollution Emergency Plan (SMPEP) or Shipboard Oil Pollution Emergency Plan (SOPEP) (equivalent to class).

7.13.3.2 Monitoring and Evaluation

Monitoring and evaluation is conducted to assist in identifying resources that are at risk of exposure, directing response efforts and evaluating the effectiveness of response techniques. Monitoring activities are conducted throughout the incident response and include:

- Manual Spill Trajectory – manual vectoring and software (e.g. ADIOS) to predict the weathering and trajectory of the hydrocarbon.
- Oil Spill Trajectory Modelling (OSTM) – computer models, and computational techniques estimate the speed and direction of movement, weathering, and dispersal patterns.
- Aerial/Vessel Surveillance– observers on aircrafts or vessels use standard references to characterise surface oil type, movement, and behaviour.
- Satellite Tracking Buoys – are heavy duty floating devices designed for deployment from the rig, support vessel or helicopters to accurately track a surface hydrocarbon spill. Tracking buoys contain a global satellite tracking system and are used to track the leading edge or centre of a spill and provide an oil spill response team with information to plan the incident response.
- Satellite Imagery – a method that uses remote sensing technologies to identify and track surface oil.

7.13.3.3 Protection and Deflection

Protection and deflection response will be under the direction of the relevant State Control Agency (as detailed in the OPEP) and involve using specialist equipment (e.g. nearshore booms and skimmers) to divert floating oil away from sensitive receptors. Techniques vary depending on the location and type of sensitivity being protected.

7.13.3.4 Shoreline Clean-up

Shoreline clean-up will be under the direction of the relevant State Control Agency (as detailed in the OPEP). Shoreline clean-up involves the deployment of personnel to relevant shorelines to identify response priorities, access points and clean-up techniques required. Shoreline clean-up may involve different manual and mechanical recovery techniques to pre-clean shorelines pre-impact and remove oil and contaminated debris from the shoreline post-impact to reduce environmental impact from stranded, typically weathered, hydrocarbons. Resourcing and equipment details are provided in the OPEP.

Shoreline clean-up consists of different manual and mechanical recovery techniques such as:

- Natural recovery – allowing the shoreline to self-clean (no intervention undertaken).
- Manual collection of oil and debris – the use of people to collect oil from the shoreline.
- Mechanical collection – use of machinery to collect and remove stranded oil and contaminated material.
- Sorbents – use of sorbent padding to absorb oil.
- Vacuum recovery, flushing, washing – the use of high volumes of low-pressure water, pumping and/or vacuuming to remove floating oil accumulated at the shoreline.
- Sediment reworking – move sediment to the surf to allow oil to be removed from the sediment and move sand by heavy machinery.
- Vegetation cutting – removing oiled vegetation.

7.13.3.5 Oiled Wildlife Response

The level of oiled wildlife response (OWR) will be determined by data collected via the initial surveillance monitoring. The OWR will be conducted in accordance with the state specific marine oil and chemical spill contingency plans and relevant wildlife response plans, as directed by the relevant State Control Agency (as detailed in the OPEP).

Typical OWR can be separated into three stages, including:

- Wildlife Reconnaissance - situational awareness / visual observations of species present and identification of species that may potentially be impacted by oil exposure and/or response strategies.
- Preventative Actions:
    - Deterrence strategies e.g. hazing by auditory or visual scarers.
    - Displacement strategies e.g. fencing or barricading techniques.
    - Pre-emptive capture - removal of wildlife from an area and transportation to a staging facility or to an area not expected to be impacted.

- Wildlife Rescue:
  - Capture of oiled wildlife – action only to be completed by trained wildlife handlers at direction of relevant Control Agency.
  - Transportation to field processing facility and / or primary care facility staging.
  - Triage – undertaken by trained veterinarians (euthanasia may be required).
  - Stabilisation – of wildlife prior to cleaning.
  - Cleaning – rinsing, washing, drying to remove contamination.
  - Rehabilitation – feeding, swimming, waterproofing, conditioning, pre-releases assessment.
  - Release – once approved.

7.13.3.6 Waste Management

Hydrocarbon spills to the marine environment can generate significant amounts of waste that need to be collected, stored, and disposed of appropriately, in accordance with MARPOL 73/78 Annex V – Garbage, relevant Commonwealth and State/Territory laws and regulations. The potential waste that may be generated during an oil spill response may include:

- Offshore recovery (i.e. from containment and recovery), and
- Shoreline clean-up operations (i.e. manual or mechanical collection).

Due to the high volatility nature of both hydrocarbon types (MDO and condensate), and their subsequent susceptibility to weathering processes (i.e. evaporation) significant volumes of waste are not anticipated. Furthermore, containment and recovery has not been identified as a primary or secondary strategy for either the condensate or MDO scenario meaning the waste storage capacity required is likely to be small.

Waste management arrangements will be implemented prior to activity commencement and will need ensure a continuous response can be maintained. For example, in the event of a clean-up operation, temporary waste handling bases will be set up at designated staging areas such as Port Welshpool. The transport of waste material may be required at sea, from sea to land and on land to on land, liquid transport trucks, flatbed trucks, dump trucks and gully suckers can be utilised to transport waste material through Beach's licensed waste contractor.

7.13.3.7 Environmental Monitoring

The Offshore Operational and Scientific Monitoring Plan (OSMP) provides a framework for Beach's environmental monitoring response for Level 2 and Level 3 offshore hydrocarbon spills from their petroleum activities undertaken in the Otway and Bass basins.

The OSMP is the principal tool for determining the extent, severity, and persistence of environmental impacts from an oil spill and allows titleholders to determine whether their environmental protection goals are met. Operational monitoring can be used to assess how effective the oil spill response is in protecting the environment. Whereas scientific monitoring can be used to direct remediation efforts, typically after the spill response activities are completed.

Oil spill monitoring has been divided into two types:

1. Operational monitoring which collects information about the spill and associated response activities to aid planning and decision making during the response or clean-up operations. Operational monitoring typically finishes when the spill response is terminated.
2. Scientific monitoring (also known as Type II or recovery phase monitoring) which is focussed on non-response objectives and evaluating environmental impact and recovery from the spill and response activities. Scientific monitoring may continue for extended periods after a spill response is terminated.

Operational monitoring studies may be implemented in conjunction with relevant response strategies as described in this OPEP (e.g. Monitoring and Evaluation, Protection and Deflection, Shoreline Clean-up, and Oiled Wildlife Response (OWR).

OSMP techniques vary, depending on the type of spill, location, and status of the response. The use of vessels, aircraft, and shoreline responders (on foot, vehicles) may be required to undertake the techniques identified within the OSMP.

7.13.4 Source of Aspect

Oil spill response strategies that could result in environmental impacts are:

- Source control – drilling of a relief well.
- Shoreline protection and deflection.
- Shoreline clean-up.
- Oiled wildlife response.
- Waste management.

7.13.5 Predicted Environmental Impacts

Impacts and risks associated with source control, and monitoring and evaluation oil spill response strategies are similar to those discussed for vessel and rig aspects in Section 7. Impacts and risks associated with the following response strategies that are undertaken onshore are assessed in this section:

- Oiled Wildlife Response (OWR).
- Shoreline Protection and Deflection.
- Shoreline Clean-up.

OWR techniques such as hazing, capture and cleaning can cause direct impacts to fauna. In addition, the use of personnel, vehicles, or equipment for shoreline response may disturb nesting or breeding areas.

Shoreline protection, deflection or clean-up strategies can result in damage or removal of habitat, disturbance to fauna and impacts to socio-economic and cultural features.

7.13.6 EMBA

Predicted impacts resulting from onshore oil spill response will be limited to shorelines where the Operational NEBA has identified that onshore oil spill response will have a net environmental benefit. the within the Oil Spill Response Area (). It should be noted that the Oil Spill Response Area does not represent a single spill but is the outcome of the oil spill modelling which typically uses a 100 different spill scenarios.

No areas of actionable shoreline oil (>100 g/m^2) were identified outside of Victoria and Tasmania with the main areas being King Island and the Otway Coast (Figure 7-12 and Figure 7-13).

7.13.7 Predicted Level of Impact

7.13.7.1 Ecological Receptors

The incorrect handling of oiled fauna during the capture, transportation, cleaning, or rehabilitation phase has the potential to result in increased stress levels which may result in increased fauna stress, injury, or mortality. Deliberate disturbance of individuals species away from an oiled environment, such as resting, feeding, breeding, or nesting area, with the intention to limit hydrocarbon exposure may cause further distress to individuals, specifically fauna which display high site fidelity.

Shoreline response may result in impacts to shoreline habitats (e.g. dunes) and vegetation, which increases the potential to disturb fauna which use these shoreline environments. Damage or removal of habitat (such as contaminated sand from beaches) may expose shorelines to erosion processes or decrease in fauna and flora. Any impacts to intertidal shoreline habitats and communities may have indirect effects on ecosystem dynamics through impacts on food chains of the macrofauna communities which they support.

The additional noise as a result of response activities, or the deliberate noise during hazing activities, may result in disturbance to species feeding, breeding, nesting, or resting. Although fauna interactions from oiled wildlife response and shoreline clean-up techniques are expected to be limited to the duration of the response, there is the potential that these effects may result in longer term impacts to local populations where a large proportion of the local population may be exposed to oil and subsequently oiled wildlife response.

Oiled wildlife and shoreline deflection, protection and clean-up preparedness and response will be undertaken in accordance with the relevant EPOs and EPSs detailed within the Offshore Oil Pollution Emergency Plan (OPEP).

Oiled wildlife surveillance and wildlife impact studies are detailed within the Offshore Operational and Scientific Monitoring Plan (OSMP).

The consequence to ecological receptors is assessed as Moderate (2) and likelihood as highly unlikely, and the risk is of an acceptable level based on:

- The likelihood of a spill event is assessed as highly unlikely. Though offshore drilling spill events have occurred in the industry Beach has significant experience operating and drilling in the Otway and Bass basins without incident.
- An operational NEBA will be conducted in the event of a spill prior to the implementation of a response to ensure that there is a net environmental benefit of the response techniques. Any

oiled wildlife and shoreline deflection, protection and clean-up response will be at the direction of the State Control Agency with Beach providing support.

- In addition, in consultation with State Control Agency and relevant stakeholders, and prior to undertaking shoreline clean-up operations, Beach shall undertake a risk assessment (Beach's Risk Assessment Process will be used unless otherwise directed) to mitigate potential impacts to:
  - Shoreline habitats
  - Shoreline communities
  - Oiled wildlife
- Shoreline protection, deflection and clean-up activities are well practiced and the impacts from these activities are well understood.
- Only trained wildlife handlers will approach and handle oiled fauna to ensure distress and injury is limited and the correct handling of individuals is conducted.
- Only trained response personnel from Beach Energy, AMSA, AMOSC, the relevant state Control Agencies, and subject matter experts will be used to implement the response strategies to ensure best practice is undertaken and the risks are reduced.
- The oil spill response activities will be conducted in accordance with the relevant EPOs and EPSs detailed within the Offshore Oil Pollution Emergency Plan (OPEP).

7.13.7.2 Socio-economic Receptor

No areas of actionable shoreline oil (>100 g/m^2) were identified outside of Victoria and Tasmania with the main areas being King Island and the Otway Coast (Figure 7-12 and Figure 7-13).

Shoreline protection, deflection and clean-up or response actions have the potential to exclude local residents and tourists from coastal areas with indirect impacts local tourism and businesses. The presence of hydrocarbons on shorelines as well as the presence of clean-up operations may necessitate the implementation of exclusion zones (e.g., beach closures).

Depending on the spill scenario, protection, deflection, and clean-up operations are expected to take anywhere from days to months following a spill incident. However, the characteristics and properties of MDO and gas condensate will result in rapid weathering and low expected persistence within the environment. Therefore, any impacts are expected to be localised and relatively short-term.

Shoreline Protection, Deflection and Clean-up preparedness and response shall be undertaken in accordance with the relevant EPOs and EPSs detailed within the Offshore Oil Pollution Emergency Plan (OPEP).

Hydrocarbon on shorelines and shoreline sediment impacts studies are detailed within the Offshore Operational and Scientific Monitoring Plan (OSMP).

The consequence to socio-economic receptors is assessed as Moderate (2) and likelihood as highly unlikely, and the risk is of an acceptable level based on:

- The likelihood of a spill event is assessed as highly unlikely. Though offshore drilling spill events have occurred in the industry Beach has significant experience operating and drilling in the Otway and Bass basins without incident.
- An operational NEBA will be conducted in the event of a spill prior to the implementation of a response to ensure that there is a net environmental benefit of the response techniques. Any shoreline deflection, protection and clean-up response, access to shoreline and closure of areas will be at the direction of the State Control Agency.
- In addition, in consultation with State Control Agency and relevant stakeholders, and prior to undertaking shoreline clean-up operations, Beach shall undertake a risk assessment (Beach's Risk Assessment Process will be used unless otherwise directed) to mitigate potential impacts to socio-economic receptors.
- Shoreline protection, deflection and clean-up activities are well practiced and the impacts from these activities are well understood.
- Only trained response personnel from Beach, AMSA, AMOSC, the relevant state Control Agencies, and subject matter experts will be used to implement the response strategies to ensure best practice is undertaken and the risks are reduced.
- The oil spill response activities will be conducted in accordance with the relevant EPOs and EPSs detailed within the Offshore Oil Pollution Emergency Plan (OPEP).

7.13.7.3 Conservation Values and Sensitivities

There is the potential for shoreline oil at actionable thresholds (>100 g/m^2) to occur within the following areas that have conservation values:

- Great Oceans Road and Scenic Environs National Heritage Area
- Lavinia Ramsar-listed wetlands and Nature Reserve
- Princetown, Lower Aire and Western Port Wetlands
- A number of Victorian and Tasmanian State Reserve

No areas of actionable shoreline oil (>100 g/m^2) were identified outside of Victoria and Tasmania with the main areas being King Island and the Otway Coast (Figure 7-12 and Figure 7-13).

Conservation values and sensitivities (ecological, socio-economic and/or cultural) of protected areas can potentially be impacts by onshore spill response activities from access of vehicles, vessels, and responders along. Shoreline response activities are undertaken in a manner to prevent impacts and an operational NEBA will be conducted in the highly unlikely event of a spill prior to the implementation of a response to ensure that there is a net environmental benefit of the response techniques. Any shoreline deflection, protection and clean-up response, access to shoreline and closure of areas will be at the direction of the State Control Agency.

Shoreline Protection, Deflection and Clean-up preparedness and response shall be undertaken in accordance with the relevant EPOs and EPSs detailed within the Offshore Oil Pollution Emergency Plan (OPEP).

Hydrocarbon on shorelines and shoreline sediment impacts studies are detailed within the Offshore Operational and Scientific Monitoring Plan (OSMP).

The consequence to conservation values and sensitivities is assessed as Minor (1) and likelihood as highly unlikely, and the risk is of an acceptable level based on:

- The likelihood of a spill event is assessed as highly unlikely. Though offshore drilling spill events have occurred in the industry Beach has significant experience operating and drilling in the Otway and Bass basins without incident.
- An operational NEBA will be conducted in the event of a spill prior to the implementation of a response to ensure that there is a net environmental benefit of the response techniques. Any shoreline deflection, protection and clean-up response, access to shoreline and closure of areas will be at the direction of the State Control Agency.
- In addition, in consultation with State Control Agency and relevant stakeholders, and prior to undertaking shoreline clean-up operations, Beach shall undertake a risk assessment (Beach's Risk Assessment Process will be used unless otherwise directed) to mitigate potential impacts to:
    - Shoreline habitats
    - Shoreline communities
    - Oiled wildlife
    - Cultural heritage sites
    - Socio-economic receptors
- Shoreline protection, deflection and clean-up activities are well practiced and the impacts from these activities are well understood.
- Only trained response personnel from Beach, AMSA, AMOSC, the relevant state Control Agencies, and subject matter experts will be used to implement the response strategies to ensure best practice is undertaken and the risks are reduced.
- The oil spill response activities will be conducted in accordance with the relevant EPOs and EPSs detailed within the Offshore Oil Pollution Emergency Plan (OPEP).

7.13.7.4 Cultural Environment

There is the potential for shoreline oil at actionable thresholds (>100 g/m^2) to occur along parts of the Victoria and Tasmania coastline with the main areas being King Island and the Otway Coast (Figure 7-12 and Figure 7-13). No areas of actionable shoreline oil (>100 g/m^2) were identified outside of Victoria and Tasmania (Figure 7-12 and Figure 7-13).

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Cultural values such as fauna, flora, objects, and country can potentially be impacted by onshore spill response activities from access of vehicles, vessels, and responders. Shoreline response activities are undertaken in a manner to prevent impacts and an operational NEBA will be conducted in the highly unlikely event of a spill prior to the implementation of a response to ensure that there is a net environmental benefit of the response techniques. Any shoreline deflection, protection and clean-up response, access to shoreline and closure of areas will be at the direction of the State Control Agency.

Shoreline Protection, Deflection and Clean-up preparedness and response shall be undertaken in accordance with the relevant EPOs and EPSs detailed within the Offshore Oil Pollution Emergency Plan (OPEP).

Hydrocarbon on shorelines and shoreline sediment impacts studies are detailed within the Offshore Operational and Scientific Monitoring Plan (OSMP).

The consequence to cultural values is assessed as Minor (1) and likelihood as highly unlikely, and the risk is of an acceptable level based on:

- The likelihood of a spill event is assessed as highly unlikely. Though offshore drilling spill events have occurred in the industry Beach has significant experience operating and drilling in the Otway and Bass basins without incident.
- An operational NEBA will be conducted in the event of a spill prior to the implementation of a response to ensure that there is a net environmental benefit of the response techniques. Any shoreline deflection, protection and clean-up response, access to shoreline and closure of areas will be at the direction of the State Control Agency.
- In addition, in consultation with State Control Agency and relevant stakeholders, and prior to undertaking shoreline clean-up operations, Beach shall undertake a risk assessment (Beach's Risk Assessment Process will be used unless otherwise directed) to mitigate potential impacts to cultural heritage sites.
- Shoreline protection, deflection and clean-up activities are well practiced and the impacts from these activities are well understood.
- Only trained response personnel from Beach, AMSA, AMOSC, the relevant state Control Agencies, and subject matter experts will be used to implement the response strategies to ensure best practice is undertaken and the risks are reduced.
- The oil spill response activities will be conducted in accordance with the relevant EPOs and EPSs detailed within the Offshore Oil Pollution Emergency Plan (OPEP).

7.13.8 Demonstration that Impacts will be ALARP

ALARP decision context and justification	**ALARP Decision Context: B** The purpose of implementing spill response activities is to reduce the severity of impacts from an oil spill to the environment. However, if the strategies do more harm than good (i.e., they are not having a net environmental benefit) then the spill response is not ALARP.
Control measures	**Source of good practice control measures**
All spill response control measures and associated Environmental Performance Outcomes (EPOs) and Environmental Performance Standards (EPSs) are detailed within the Offshore Oil Pollution Emergency Plan (VIC 100 SAF PLN. CDN/ID 18986979).	
All relevant operational and scientific monitoring studies are detailed within the Offshore Operational and Scientific Monitoring Plan (CDN/ID S4100AH717908).	

Additional controls assessed

Control	Control type	Cost/benefit analysis	Control implemented?
Monitor and evaluate: AUVs	Engineering Risk Assessment	This control measure is not expected to provide significant environmental benefit as mobilisation of in-field monitoring, or aerial surveillance may be implemented rapidly via existing contracts. Costs associated with acquiring the equipment, maintenance, and training personnel to use AUVs is considered grossly disproportionate to the benefit gained.	No
Monitor and evaluate: Night-time monitoring – infrared	Engineering Risk Assessment	Side looking airborne radar, systems are required to be installed on specific aircraft or vessels. The costs of sourcing such vessels/aircraft is approximately $20,000 per day. Infrared may be used to provide aerial monitoring at night-time, however the benefit is minimal given trajectory monitoring (and infield monitoring during daylight hours) will give good operational awareness. In addition to this, satellite imagery may be used at night to provide additional operational awareness.	No
OWR: Pre-positioning of oiled wildlife response resources.	Precautionary approach	Oiled wildlife response equipment containers for first strike activities are positioned in Geelong (AMOSC). Positioning the equipment any closer to the potential spill area is not considered to provide a considerable environmental benefit considering that any visible shoreline contact is not predicted until day 4-5 of the spill (depending on the spill source location), therefore there is adequate time to deploy equipment positioned in Geelong. Additionally, spill modelling indicates potential (hypothetical)	No

		areas of exposure to hydrocarbons, post-spill operational monitoring would be required to predict actual or likely exposure locations, therefore determining an area to pre-position equipment may be inaccurate pre-spill.	
Shoreline protection and clean up: Tactical Response Plans	Precautionary approach	Identified areas for priority protection have pre-populated tactical response plans to reduce response planning timeframes in the event of potential shoreline exposure. Refer to OPEP for TRPs. CM13: Beach Offshore Oil Pollution Emergency Plan	Yes
Chemical Dispersant: Pre-positioning of dispersant and application equipment.	Precautionary approach	No clear benefit identified as stockpiles of dispersant already available in Melbourne and elsewhere in Australia. Application equipment and dispersant can be readily mobilised to site, with no identified restriction on logistics pathways or response timing.	No
Consequence rating	Moderate (2)		
Residual impact category	Low		

7.13.9 Demonstration that Impacts will be Acceptable

Consequence rating	Low (1) to Moderate (2)
Likelihood of occurrence	Highly Unlikely (B)
Residual risk	Low
Acceptability assessment	
To meet the principles of ESD	The spill response activities were evaluated as having the potential to result in a Low (1) to Moderate (2) consequence thus is not considered as having the potential to result in serious or irreversible environmental damage. While some response strategies may pose additional risk to sensitive receptors, to not implement response activities may potentially result in greater negative impact to the receiving environment and a longer recovery period. Response activities will be undertaken in accordance with controls which reduce and/or prevent additional risks. The mutual interests of responding and protecting sensitive receptors from further impact due to response activities will be managed using a NEBA during response strategy planning in preparedness arrangements, as well as during a response. Proposed response activities are consistent with industry practice.
Internal context	The proposed management of the impact is aligned with the Beach Environment Policy. Activities will be undertaken in accordance with the SCCP including relief well plan, OPEP, Tactical Response Plans and OSMP.
External context	Stakeholder objections or claims have been assessed in relation to hydrocarbon spills and appropriate controls have been adopted as detailed in Section 7.13.6.

	King Island Council (Stakeholder ID 8388624) and Savour King Island (Stakeholder ID 25165825) raised concerns about spill response on King Island including expertise and equipment to support response activities. Beach explained spill risks and spill response approach and support agencies. Gunaikurnai Land and Waters Aboriginal Corporation (Stakeholder ID 419613) inquired about spill response risks and approach and asked to be included as a contact regarding spills on Gunaikurnai Sea Country. Beach explained spill risks and spill response approach and support agencies and has amended its OPEP to reflect this request. During any spill response, a close working relationship with key regulatory bodies (Control Agencies) will occur and thus there will be ongoing consultation with relevant persons during response operations.
Other requirements	Response has been developed in accordance with: • OPGGS Act. • AMSA Technical Guideline for the Preparation of Marine Pollution Contingency Plans for Marine and Coastal Facilities (AMSA, 2015); and NOPSEMA (2017). • South-east Commonwealth Marine Reserves Network Management Plan 2013-23 (Director of National Parks, 2013) • The following Conservation Advice / Recovery Plans identify pollution as a key threat: • Conservation Advice *Balaenoptera borealis* (sei whale) (TSSC 2015g) • Conservation Advice *Balaenoptera physalus* (fin whale) (TSSC 2015f) • Recovery Plan for Marine Turtles in Australia (CoA 2017b), identified as acute chemical discharge (oil pollution) • Conservation Advice *Calidris ferruginea* (curlew sandpiper) (DoE, 2015f) identified as habitat degradation/ modification (oil pollution). • Conservation Advice for *Calidris acuminata* (sharp-tailed sandpiper) (DCCEEW 2024h) identified wetlands and intertidal habitats threatened by acute pollution (oil). • Conservation Advice for *Arenaria interpres* (ruddy turnstone) (DCCEEW 2024i) identified wetlands and intertidal habitats threatened by acute pollution (oil). • National Recovery Plan for Threatened Albatrosses and Giant Petrels 2011-2016 (DSEWPC 2011a) • National Recovery Plan for the Australian Fairy Tern (Sternula nereis nereis) (CoA 2020b) The following Conservation Advice / Recovery Plans identify habitats degradation/modification as threat, which may be consequence of accidental release of hydrocarbon: • Conservation Advice for *Calidris tenuirostris* (great knot) (DCCEEW 2024f). • Conservation Advice for *Calidris canutus* (red knot) (DCCEEW 2024g). • Conservation Advice for *Limosa lapponica baueri* (Alaskan bar-tailed godwit) (DCCEEW 2024d)

	• Conservation Advice for *Limosa limosa* (black-tailed godwit) (DCCEEW 2024c). • Conservation Advice for *Numenius madagascariensis* (eastern curlew) (DoE 2015e). • These Conservation Advice and Recovery Plans identify the following conservation actions: • minimise chemical and terrestrial discharge. • ensure spill risk strategies and response programs include management for turtles and their habitats, particularly in reference to 'slow to recover habitats', e.g. nesting habitat, seagrass meadows or coral reefs. • ensure appropriate oil-spill contingency plans are in place for the subspecies' breeding sites which are vulnerable to oil spills. • implement measures to reduce adverse impacts of habitat degradation and/or modification; or • no explicit relevant management actions: oil pollution is recognised as a threat. In regard to oil spill response, activities associated with the drilling activity will not be conducted in a manner inconsistent with the objectives of the respective zones of the AMPs, and the principles of the IUCN Area Categories applicable to the values of the AMPs.
Monitoring and reporting	Impacts will be monitored in accordance with Section 8.4.3.
Acceptability outcome	**Acceptable**

7.14 Cumulative Impact Assessment

7.14.1 Overview

NOPSEMA defines cumulative environmental impacts in the context of offshore petroleum activities, as successive, additive, or synergistic impacts of collectively significant activities or projects with material impacts on the environment that have the potential to accumulate over temporal and spatial scales (NOPSEMA Environment Plan Decision Making Guideline, N-04750-GL1721 A524696, Dec 2022).

The effects of past projects and activities, and currently operating projects, are captured when describing the existing condition of, and any pressure or threats affecting the environment (see Section 4 Description of the Environment). This baseline condition and understanding of the capacity of the receiving environment and receptors to accommodate changes, in light of existing pressures and threats, informs the environmental impact assessments conducted in Section 7 of this EP.

The focus of Cumulative Impact Assessment (CIA) is to further build on these assessments by considering the impacts of the proposed activity on key receptors (or key matters) in conjunction with the impacts from other reasonably foreseeable future projects.

The types of activities and projects typically considered in CIA are large in scale and are of relevance in terms of potentially contributing to or compounding material impacts in the relevant project area.

7.14.2 Methodology

Guidance from the United Kingdom (UK) National Infrastructure Planning Advice Note Seventeen: Cumulative effect assessment relevant to nationally significant infrastructure programs (UK 2019) and the New South Wales (NSW) Cumulative Impact Assessment Guidelines for State Significant Projects (NSW 2022), form the basis of this assessment.

Both the UK and NSW guidelines are intended to apply to large-scale national and state significant projects, respectively, with greater potential for cumulative impacts into the long-term. Consequently, the assessment process applied here has been adapted to the nature and scale of the activities associated with the Drilling Program.

7.14.3 Key Terms

Key terms used in the CIA are:

Key environmental matters are features of the environment (ecological, socio-economic, and cultural values and sensitivities) that are valued because of their rarity or importance, including the critical role they play in supporting systems which are essential for the environment, people and / or the economy (NSW 2022), for example, commercial fisheries and threatened species undertaking biologically important behaviours.

Material impacts are impacts of the Drilling Program and other reasonably foreseeable future projects and activities that may not align with the defined acceptable levels, for example, threats of wide-scale, serious or irreversible damage due to cumulative impacts.

Successive impacts are those that occur one after the other.

Additive impacts are those where the combined impact is the sum of the separate impacts.

Synergistic impacts are those where the combined impact is greater than the sum of the separate impacts.

The relevant **spatial extent** depends on the key environmental matter. For example, for ecological impacts the spatial extent may be based on the range and distribution of a listed threatened species when undertaking biologically important behaviour. NSW (2022) recommends that while the CIA area chosen for each matter must be broad enough to capture all relevant cumulative impacts, it should not be unnecessarily large or include areas where the cumulative impacts are likely to be negligible relative to the baseline condition of the relevant matter.

Temporal extent is dependent on the key environmental matter and the scale and nature of potential impacts on the matter (NSW 2022). For example, for commercial fishers the temporal extent may be based on a part of a season or several seasons depending on how long the impact may occur. For this CIA the temporal extent selected has been aligned to reasonably foreseeable timeframes associated with the Drilling Program and other reasonably foreseeable projects and activities within the Otway and Bass Basins.

7.14.4 Identifying Reasonably Foreseeable Future Projects and Activities CIA Scoping

This CIA considers projects and activities that are reasonably foreseeable within the spatial and temporal extent of the assessment. This defines the boundaries of the assessment by including projects and activities that have a realistic likelihood of occurring and could contribute to cumulative impacts.

To identify reasonably foreseeable future projects and activities a search was conducted of the NOPSEMA and DEECA (Vic) Environment Plan website to identify any relevant projects and activities. In addition, petroleum titleholders within the Otway and Bass Basins have been meeting regularly to discuss environmental management in the region, including processes for improved CIA, focusing on reasonably foreseeable activities. This has provided a more accurate representation of projects and activities and the potential for cumulative impacts, ensuring that relevant impacts are appropriately assessed and managed.

Reasonably foreseeable future projects and activities identified to date, within the term of the EP, are detailed in Table 7-20. Projects and activities that are not reasonably foreseeable or speculative have been excluded from the assessment scope to maintain practicality and relevance in decision-making processes.

Information on projects and activities is typically accessible once consultation commences and relevant technical supporting information is submitted for public comment or assessment. Information relevant to this CIA has been discussed at the ongoing Otway Basin Petroleum Titleholder meetings. Where project/activity-specific data is not yet available, data from similar projects has been used as a proxy prior to technical information being made available. Given the similarity of impacts, there is a high level of certainty in the prediction of cumulative impacts in most cases.

Assumptions around specific timings for projects or activities have been made as there is some level of uncertainty in schedule and timing of approvals to support activities. Consequently, a conservative approach has been adopted whereby credible worst-case scenarios (e.g. concurrent activities with overlapping EMBAs) are assessed.

7.14.5 CIA Scoping

Scoping is undertaken to identify the key environmental matters that could be materially affected by the cumulative impacts of the Drilling Program and other reasonably foreseeable future projects and require a detailed CIA.

The scoping steps are detailed below, and the scoping assessment details in Table 7-21.

- Step 1: Identify the receptors that are predicted to be impacted by the Drilling Program planned aspects as per the environmental impact evaluation in Section 7.
- Step 2: Define the cumulative impact acceptable level for each receptor based on the acceptable level assessment for each receptor/aspect as detailed in Section 7.
- Step 3: Define the spatial extent for the assessment based on the range and distribution of the receptor and/or where the impacts of the Drilling Program associated with the receptor overlap with impacts from other reasonably foreseeable future projects and activities.
- Step 3: Define the temporal extent for the assessment on when the receptor is likely or known to be present within the defined spatial extent and for the period that the impact will occur.
- Step 4: Identify projects and activities that are reasonably foreseeable within the spatial and temporal extent of the assessment as detailed in Section 7.14.4.
- Step 5: Identify where there is the potential for receptors to be materially affected by the cumulative impacts of the Drilling Program and other reasonably foreseeable future projects. These receptors are then required to have a detailed CIA as per Section 7.14.6.
- Step 6: Identify the level of certainty of the scoping assessment. The certainty of the assessment is high based on the points below. If one of these is not met, then a cautious approach is undertaken, and the receptor is required to have a detailed CIA as per Section 7.14.6.
    - Impacts are well understood.
    - Impacts are relatively easy to predict using standard methods.
    - Impacts are capable of being mitigated to comply with relevant standards and to meet the acceptable level.

7.14.6 Detailed CIA

For those receptors and aspects where a potential cumulative cause-effect pathway and material impact was identified in the scoping, a more detailed CIA assessment was applied in general alignment with the impact methodology described in Section 2. The outcome of this detailed assessment is in Table 7-22.

The CIA process applied to each aspect and component of the environment was:

- Identification of:

  - Receptor conservation values or values relevant to CIA e.g. EPBC Listed Threatened Species, MNES, commercial or cultural significance.
  - Legislative or other requirements relevant to the assessment.
  - Relevant threatening processes.
  - Relevant spatial extent such as BIAs, and temporal extent when receptor present including any biologically important features such as behaviours or critical life-cycle stages, timings.
  - Relevant actions from legislative or other requirements.
- Detail the baseline existing environment including pressures and condition.
- Define the cumulative impact acceptable level.
- Identification of other reasonably foreseeable future projects where the aspect overlaps the identified relevant spatial extent.
- Assessment of potential for cumulative impacts:
  - Description of potential cumulative impact.
  - Detail the level of certainty of the assessment.
  - Detail Beach' existing control measures.
  - Comparison to acceptable level(s), and where required (reiterative process) identification of additional control measures and demonstration that cumulative impacts are as low as reasonably practicable (ALARP).
- Detailing any additional actions.

The potential cumulative impacts to the key receptors were evaluated as being Minor (2). No additional controls were identified however Beach will continue to work with other titleholders undertaking activities within the Otway Basin with the aim of identifying and minimising the potential for cumulative impacts, in addition to cooperation on monitoring and management to increase effectiveness.

OGV Drilling Program

Table 7-20: Reasonably Foreseeable Future Projects and Activities in Otway and Bass Basins

Titleholder	Activity	Basin	Status	Timing Window	Potential Temporal Overlap with the Drilling Program	Potential Spatial Overlap with the Drilling Program
Beach Energy	Otway Operations	Otway	Existing and future Operations	Ongoing	Temporal overlap of IMR campaigns and platform resupply and EMBAs with Drilling Program activities.	Spatial overlap of Operations infrastructure, IMR campaigns and platform resupply and EMBAs with Drilling Program activities.
Beach Energy	Bass Operations	Bass	Existing and future Operations	Ongoing	Temporal overlap of IMR campaigns and platform resupply and EMBAs with Drilling Program activities.	Spatial overlap of Operations infrastructure, IMR campaigns and platform resupply and EMBAs with Drilling Program activities.
Beach Energy	Well Completion and Intervention	Otway	Proposed	2025-2026	No temporal overlap of Drilling Program with Well Completion and Intervention Development Drilling Program (as activities undertaken by same rig).	No spatial overlap of Drilling Program with Well Completion and Intervention Program (as activities undertaken by same rig).
Beach Energy	Well Completion and Intervention Program	Bass	Proposed	2026	No temporal overlap of Drilling Program with Well Completion and Intervention Program (as activities undertaken by same rig).	No spatial overlap of Drilling Program with Well Completion and Intervention Program (as activities undertaken by same rig).
Beach Energy	Offshore Gas Victoria Development	Otway	Proposed	2026 - 2027	No temporal overlap as Drilling Program at Otway will be completed prior to main installation and commissioning commences. Early installation work associated with existing pipeline may overlap with Drilling Program for short period during Jan to March 2026 in VIC/P43.	Spatial overlap of Drilling Program and Development as Development includes Otway wells. Permanent infrastructure is covered in Otway Operations.
Beach Energy	Offshore Gas Victoria Development	Bass	Proposed	2026 -2027	No temporal overlap as Drilling Program at Bass will be completed prior to main installation and commissioning commences.	Spatial overlap of Drilling Program and Development as Development includes Bass wells.

OGV Drilling Program

Titleholder	Activity	Basin	Status	Timing Window	Potential Temporal Overlap with the Drilling Program	Potential Spatial Overlap with the Drilling Program
					Early brownfield work associated with existing platform may overlap with Drilling Program for short period during Jan to March 2026.	Permanent infrastructure is covered in Bass Operations.
Cooper Energy	CHN Operations	Otway	Exiting Operations	Ongoing	Potential temporal overlap of IMR campaigns EMBAs with Drilling Program activities.	Potential spatial overlap of IMR campaigns EMBAs with Drilling Program activities.
Cooper Energy	Drilling	Otway	Proposed	2024-2026	Titleholders are part of a rig consortium which has signed an agreement with Transocean to bring a semi-submersible rig to the offshore Otway Basin in 2025. Thus, consecutive drilling/P&A activities will occur, but no concurrent drilling activities will occur.	
Conoco Phillips	Drilling	Otway	Proposed	2024-2026 (~30-40 days per well, max 6 wells)		
Woodside Energy	Minerva Decommissioning (P&A)	Otway	Proposed	2024-2025 (< 2 months)		
CGG- Regia	Seismic Survey	Otway	Proposed	2024-2028 60 days acquisition 90 days in field One survey between November – May) or Two separate surveys April – June, and or September – November.	Consecutive drilling/P&A activities will occur. Concurrent drilling activities unlikely. Concurrent seismic operations unlikely. Consecutive seismic surveys likely. Concurrent seismic survey and drilling/P&A activities likely.	Unlikely direct spatial overlap of drilling/P&A areas. Unlikely direct spatial overlap of seismic survey areas. Possible overlap of seismic survey area and drilling/P&A activities. Unlikely overlap of sound EMBAs of concurrent seismic survey and drilling/P&A at single location. Possible overlap of light EMBAs associated with concurrent seismic survey and drilling/P&A at a single location.
TGS -NOPEC Geophysical Company	Seismic Survey	Otway	Proposed	2023-2027		

Table 7-21: CIA Scoping Tool

Receptors	Planned Environmental Aspects							CIA – Scoping Assessment					
	Physical Presence	Seabed Disturbance	Light Emissions	Underwater Sound	Atmospheric Emissions including GHG	Marine Discharges – Rig and Vessels	Marine Discharges – Drilling and P&A	Acceptable Level	Potential for Cumulative Impact Spatial Extent	Potential for Cumulative Impact Temporal Extent	Scoping Assessment Outcome	Level of Certainty of Scoping Assessment	Cumulative Cause-effect Pathway
Australian Marine Parks			✓					Not inconsistent with SE Marine Parks Network Management Plan.	Y Zeehan and Boags AMPs	Y Activities planned to be undertaken during periods of biologically important behaviours for conservation values	The Zeehan AMP is overlapped by the Beach Drilling Program light and sound EMBAs, the Beach OGV Development (Otway), COPA Drilling Project, TGS MSS and potentially the Beach Otway OGV Development light and sound EMBAs. The Boags AMP is overlapped by the Beach Drilling Program light EMBA and potentially the Beach Bass OGV Development light EMBA. Zeehan AMP values potentially impacted by light are seabirds and for sound are migrating blue whales and humpback whales. Boags AMP values potentially impacted by light are seabirds.	High	Identified for seabirds and whales and further assessment required to determine if impacts are material.
State Marine Protected Areas			✓					Not inconsistent with	Y Twelve Apostles Marine National Park	N Period of activities	The Twelve Apostles Marine National Park is overlapped by the Beach Drilling Program light EMBA. Light sensitive receptors relevant to the values of the Twelve Apostles Marine National Park are invertebrates and fish. Impacts to invertebrates and fish from light is only predicted up to 200 m from the light source and the Operational Area where rig and vessel lighting will occur is ~18 km from the Twelve Apostles Marine National Park.	High	None identified
Maritime Archaeological Heritage		✓						No disturbance of maritime archaeological heritage.	N Only single drilling operation at any one time	N Control Measures in place to detect and prevent interactions	The Drilling Program Operational Area overlaps one known shipwreck. Other projects may overlap known maritime archaeological heritage and potentially unknown maritime archaeological heritage. Impacts to maritime archaeological heritage are not predicted from seismic surveys. Drilling and infrastructure installation activities required to undertake seabed surveys prior to seabed disturbance. Impacts to maritime archaeological heritage are not a planned event and therefore cumulative impacts are not predicted.	High	None identified
Key Ecological Features		✓					✓	Temporary, small-scale, and recoverable impacts.	N Limited to weeks-months after individual activity	N Limited to weeks-months after individual activity	For the Drilling Program the northern T/30P Operational Area overlaps the West Tasmania Canyons KEF were up to two wells may be drilled. Based on the greatest diversity of habitat is between 200 m and 350 m impacts from light emissions are not predicted. Seabed surveys will be undertaken of the KEF prior to the commencement of the Drilling Program within the KEF to allow for the consideration of seabed habitat type in the final selection of well locations to avoid area of high relief outcrops, reefs or sponge beds. Thus, impacts from the Drilling Program are predicted to be at a very small scale, which is not predicted to be material to contribute to cumulative impacts.	High	Identified but impacts not material no further assessment required.
Benthic Habitats and Communities							✓	Temporary, small-scale, and recoverable impacts.	N Limited to individual activity area	N Limited to weeks-months after individual activity	Impacts to benthic habitats and communities from seabed disturbance including drill cuttings and cement discharges are predicted to be within 500 m of each well location. Thus, impacts from the Drilling Program are predicted to be at a very small scale, which is not predicted to be material to contribute to cumulative impacts.	High	Identified but impacts not material no further assessment required.

Receptors	Planned Environmental Aspects							CIA – Scoping Assessment					
	Physical Presence	Seabed Disturbance	Light Emissions	Underwater Sound	Atmospheric Emissions including GHG	Marine Discharges – Rig and Vessels	Marine Discharges – Drilling and P&A	Acceptable Level	Potential for Cumulative Impact Spatial Extent	Potential for Cumulative Impact Temporal Extent	Scoping Assessment Outcome	Level of Certainty of Scoping Assessment	Cumulative Cause-effect Pathway
Plankton			✓			✓	✓	Temporary, small-scale, and recoverable impacts.	N Limited to individual activity area with exception of multiple seismic operations	N Recovery days post activity	Discharges to the water column are not predicted to impact water quality at a cumulative scale and therefore will not impact plankton at an ecological integrity level. Continuous noise from drilling, vessel and installation operations not predicted to impact plankton. Impacts from VSP, if undertaken, are not within the scope of this EP. Impacts from geophysical surveys are predicted to result in impacts at very small scale, this is not predicted to be material to contribute to cumulative impacts.	High	None identified
Invertebrates		✓	✓				✓	Temporary, small-scale, and recoverable impacts.	N Limited to individual activity area with exception of multiple seismic operations	N Limited to weeks-months after individual activity	Continuous noise from drilling and vessels are not predicted to impact invertebrates. Light impacts to invertebrates are within 200 m of vessel/rig lighting and is not material in the area where squid fishing occurs. Impacts to benthic invertebrates from seabed disturbance including drill cuttings and cement discharges are predicted to be within 500 m of each well location. Thus, impacts from the Drilling Program are predicted to be at a very small scale, which is not predicted to be material to contribute to cumulative impacts.	High	None identified
Fish and Sharks			✓	✓		✓	✓	Not inconsistent with EPBC Act Management Plans and Recovery Plans. Temporary, small-scale and recoverable impacts.	N Limited to individual activity with exception of multiple seismic operations	N No periods of biologically important behaviours for sensitive species s	No cumulative impact effect pathway identified. Light impacts to fish are within 200 m of vessel/rig lighting and underwater sound impacts within 160 m of well location. Discharges to the water column are not predicted to impact water quality at a cumulative scale and therefore will not impact fish and sharks at an ecological integrity level. Thus, impacts from the Drilling Program are predicted to be at a very small scale, which is not predicted to be material to contribute to cumulative impacts.	High	None identified
Birds			✓					Not inconsistent with EPBC Act Management Plans and Recovery Plans. Temporary, small-scale, and recoverable impact.	Y BIAs for sensitive species	Y Periods of biologically important behaviours for sensitive species	There is potential for cumulative impacts associated with light (vessel/rig lighting and flaring) depending on location of activities and sensitive receptors, i.e. foraging, migrating, and breeding birds.	High	Identified and further assessment required to determine if impacts are material.
Marine Reptiles			✓	✓		✓	✓	Not inconsistent with EPBC Act Management Plans and Recovery Plans. Temporary, small-scale, and recoverable impacts.	N No BIAs or critical habitat	N No periods of biologically important behaviours for sensitive species	Individuals in the area are expected to be transient, with no BIAs, critical habitat, or biologically important behaviours within the Bass and Otway Basin. Lighting doesn't impact in water navigation or behaviours and impacts from noise will be temporary and recoverable. Sound impacts for the Drilling Program are restricted to within 100 m of the well location. Discharges to the water column are not predicted to impact water quality at a cumulative scale and therefore will not impact turtles at an ecological integrity level. Thus, impacts from the Drilling Program are predicted to be at a very small scale, which is not predicted to be material to contribute to cumulative impacts.	High	Identified but impacts not material no further assessment required.

Receptors	Planned Environmental Aspects							CIA – Scoping Assessment					
	Physical Presence	Seabed Disturbance	Light Emissions	Underwater Sound	Atmospheric Emissions including GHG	Marine Discharges – Rig and Vessels	Marine Discharges – Drilling and P&A	Acceptable Level	Potential for Cumulative Impact Spatial Extent	Potential for Cumulative Impact Temporal Extent	Scoping Assessment Outcome	Level of Certainty of Scoping Assessment	Cumulative Cause-effect Pathway
Marine Mammals				✓		✓	✓	Not inconsistent with EPBC Act Management Plans and Recovery Plans. Temporary, small-scale, and recoverable impacts.	Y BIAs for sensitive species	Y Periods of biologically important behaviours for sensitive species	There is potential for cumulative impacts associated with underwater sound depending on location of activities and sensitive receptors, i.e. foraging, and migrating endangered species. Although sound impacts are restricted to within typically 10s of kms around individual activities, activities may be occurring consecutively over a period of time and seismic and drilling at one location have the potential to occur concurrently.	High	Identified and further assessment required to determine if impacts are material.
Coastal Communities and Onshore Tourism Activities								Temporary, small-scale, and low intensity.	N	N	No cumulative impact effect pathway identified. The likelihood of visibility of multiple activities from a single vantage point is considered low given the distances offshore it is not predicted that a rig and vessels would be distinguishable from other existing vessel traffic.	High	None identified.
Offshore Petroleum Activities	✓							Temporary, small-scale, and low intensity.	N	N	Other activities are scheduled and or operate within their own exclusions zones/petroleum titles. Notice to mariners will provide advanced warning and opportunity to plan transit route. At most avoidance of a single seismic survey vessel and towed equipment, and a single drilling location at any given time with minimal impact.	High	Identified but impacts not material no further assessment required.
Offshore Renewable Energy Activities	✓							Temporary, small-scale, and low intensity.	N	N	No cumulative impact effect pathway identified. There are no reasonably foreseeable future projects/activities in offshore Otway Basin.	High	None identified.
Defence Activities	✓	✓						Temporary, small-scale, and low intensity.	Y Displacement from concurrent and consecutive activities	Y Displacement from concurrent and consecutive activities	Cumulative effect pathway identified but impacts not material. Industry standard controls in place such as notice to mariners will provide advanced warning and opportunity to plan transit route. At most avoiding a single seismic survey vessel and towed equipment, and a single drilling location at any given time with minimal impact. Drilling and installation activities are required to undertake seabed surveys prior to seabed disturbance which include techniques to identify UXO. Impacts to UXO are not predicted from seismic surveys. Impacts to UXO are not planned event and therefore cumulative impacts not predicted.	High	Identified but impacts not material no further assessment required.
Shipping	✓							Temporary, small-scale, and low intensity.	Y Displacement from concurrent and consecutive activities	Y Displacement from concurrent and consecutive activities	Cumulative effect pathway identified but impacts not material. The area of impact is small compared to the area available for shipping. Industry standard controls in place such as notice to mariners will provide advanced warning and opportunity to plan transit route. At most avoiding a single seismic survey vessel and towed equipment, and a single drilling location at any given time with minimal impact.	High	Identified but impacts not material no further assessment required.
Marine Tourism	✓							Temporary, small-scale, and low intensity.	Y Displacement from concurrent and consecutive activities	Y Displacement from concurrent and consecutive activities	Cumulative effect pathway identified but impacts not material. The area of displacement is small compared to area available for tourism. Industry standard controls in place such as notice to mariners will provide advanced warning and opportunity to plan transit route. At most avoiding a single seismic survey vessel and towed equipment, and a single drilling location at any given time with minimal impact.	High	Identified but impacts not material no further assessment required.

Receptors	Planned Environmental Aspects							CIA – Scoping Assessment					
	Physical Presence	Seabed Disturbance	Light Emissions	Underwater Sound	Atmospheric Emissions including GHG	Marine Discharges – Rig and Vessels	Marine Discharges – Drilling and P&A	Acceptable Level	Potential for Cumulative Impact Spatial Extent	Potential for Cumulative Impact Temporal Extent	Scoping Assessment Outcome	Level of Certainty of Scoping Assessment	Cumulative Cause-effect Pathway
Recreational Fishing	✓							Temporary, small-scale, and low intensity.	Y Displacement from concurrent and consecutive activities	Y Displacement from concurrent and consecutive activities	Cumulative effect pathway identified but impacts not material. The area of displacement is small compared to area available for recreational fishing. Industry standard controls in place such as notice to mariners will provide advanced warning and opportunity to plan transit route. At most avoiding a single seismic survey vessel and towed equipment, and a single drilling location at any given time with minimal impact.	High	Identified but impacts not material no further assessment required.
Commercial Fisheries	✓	✓						Affected persons will not be worse off because of the activity.	Y Displacement from concurrent and consecutive activities	Y Displacement from concurrent and consecutive activities	Cumulative effect pathway identified. Displacement of fishers operating in fisheries with spatial extent that may be overlapped by a number of offshore activities, i.e. displaced by multiple exclusion zones (rig and seismic survey) or different exclusion zone over time. Although displacement impacts are restricted to within typically 2 kms around individual activities, drilling may be occurring consecutively over a period of time and seismic and drilling at one location have the potential to occur concurrently. Minor behavioural disturbances are predicted to commercial fish species from underwater sound and cumulative impacts are not predicted.	High	Identified and further assessment required to determine if impacts are material.
First Nations Values and Sensitivities	✓	✓	✓	✓	✓	✓	✓	Not inconsistent with Indigenous Protected Area (IPA) Plans. Temporary, small-scale, and recoverable impacts.	Y Sea Country	Y Period of activities	As per the assessment of ecological receptors cumulative effect pathways where identified for whales and birds which have been identified as a cultural value. Impacts from the Drilling Program to other cultural values identified such as fish, eels, dolphins, and seals are at a very small scale, which is not predicted to be material to contribute to cumulative impacts. Impacts to submerged cultural heritage are not predicted from the Drilling Program based on a seabed survey will be undertaken prior to Drilling to identify any cultural heritage and if identified Beach will consult with the relevant First Nations groups and determine any exclusion areas or further cultural heritage management procedures that may be required	High	Identified for whales and birds and further assessment required to determine if impacts are material.

Table 7-22: Detailed CIA

Aspect	Interaction with Other Users	Light		Underwater Sound	
Receptor	**Commercial fishers**	**Seabirds and Shorebirds**	**Orange-bellied Parrot**	**Blue Whale**	**Southern Right Whale**
Conservation (or other) value and Status	Socio-economic value to local communities and national economy. The Drilling Program overlaps where there is fishing intensity for: • SESSF: Commonwealth Trawl - < 5 vessels • SESSF: Commonwealth Gillnet Hook Trap Sector Shark Gillnet – up to 8 vessels • Southern Squid Jig Fishery – up to 5 vessels • Victorian Giant Crab – up to 15 vessels • Victorian Southern Rock Lobster Fishery - up to 13 vessels Note, Beach will implement an activity limitation where wells will not be located in water depths >400 m (CM09: Drilling Program). This limitation reduces any potential impact to commercial trawl and giant crab fisheries that were identify by SETFIA (2023) as having most fishing effort between the 400 and 1,000 m isobath.	The following overlap the light EMBA for the Project Area. Foraging/Feeding behaviour and/or BIAs: • Antipodean, black-browed, Buller's, Campbell, Gibson's, Indian yellow-nosed, northern Buller's, northern royal, Salvin's, shy, southern royal, wandering, and white-capped albatrosses. • Common diving petrel, northern giant petrel, southern giant-petrel, and white-faced storm-petrel. • Flesh-footed, short-tailed, and wedge-tailed shearwaters. • White-fronted tern. Breeding behaviour: • Short-tailed shearwater, black-faced cormorant, and little penguin. Breeding BIA: • Wedge-tailed shearwaters. Roosting behaviour: • Little curlew, painted snipe, Swinhoe's snipe. Short-tailed shearwater (muttonbird) also identified cultural value.	Listed as Critically Endangered and Marine under the EPBC Act and noted as a species of cultural significance. The Drilling Program light EMBA overlaps the likely distribution and probable migration route for the orange-bellied parrot.	Listed as Endangered under the EPBC Act. The Drilling Program Operational Area and sound EMBA overlaps the blue whale foraging and annual high use foraging BIA.	Listed as Endangered under the EPBC Act and noted as a species of cultural significance in the draft National Recovery Plan for the Southern Right Whale (CoA 2022). The Drilling Program Operational Area and sound EMBA overlaps the southern right whale migration BIA. The Drilling Program Operational Area and sound EMBA do not overlap the southern right whale reproduction BIA.
Legislative or Other requirements	OPGGS Act 2006 (Cth).	National Recovery Plan for Albatrosses and Petrels (DCCEEW 2022e). Wildlife Conservation Plan for Seabirds (DCCEEW 2020). Wildlife Conservation Plan for Migratory Shorebirds (DoE 2015b). National Light Pollution Guidelines for Wildlife (CoA 2023).	National Recovery Plan for the Orange-bellied Parrot (DoE 2016) National Light Pollution Guidelines for Wildlife (CoA 2023).	Conservation Management Plan for the Blue Whale (DoE 2015) Guidance on key terms within the Blue Whale Conservation Management Plan (DAWE 2021a)	Conservation Management Plan for Southern Right Whale (DSEWPaC 2012b) Draft National Recovery Plan for the Southern Right Whale (CoA 2022)

Aspect	Interaction with Other Users	Light		Underwater Sound	
Receptor	**Commercial fishers**	**Seabirds and Shorebirds**	**Orange-bellied Parrot**	**Blue Whale**	**Southern Right Whale**
Threatening Processes Relevant to Aspect	NA	Light emissions are identified as a threat in the National Recovery Plan for Albatrosses and Petrels but marine infrastructure interactions, including those associated with artificial light, are classified as having no risk category priority and affecting 'Nil' species in Australian jurisdiction. The National Recovery Plan for Albatrosses and Petrels also states that light associated with coastal developments at or adjacent to breeding sites represents a moderate threat to short-tailed shearwater. Light pollution, including from gas flaring, is listed as a threat to seabirds in the Wildlife Conservation Plan for Seabirds, with potential for consequences affecting individuals but not whole populations.	The National Recovery Plan for the Orange-bellied Parrot identifies illuminated boats and structures within the migration route as a barrier to migration (weak evidence for impact, moderate risk rating).	Conservation Management Plan for the Blue Whale identifies anthropogenic noise interference as a threat.	Conservation Management Plan for the Southern Right Whale and draft National Recovery Plan for the Southern Right Whale identify noise interference as a threat.
Relevant Spatial and Temporal Extent	Fishery Management Areas for the duration of the Project.	The Wildlife Conservation Plan for Migratory Shorebirds identifies light as part of anthropogenic disturbance as threat. Foraging BIAs for seabirds cover either all or a large proportion of the SE Marine Bioregion. Seabird breeding behaviour and shorebird roosting behaviour is likely to occur along the coast of Victoria.	Probable Migration Route September-November (Southward); February-mid-March (northwards).	Underwater sound EMBA overlap foraging and annual high use foraging BIAs, where blue whales are typically present from January to April though whales may be present from November to June.	Overlap of underwater sound EMBA with migration BIA where southern right whales are typically present from April to October.
Relevant Actions from Legislative or Other Requirements	OPGGS Act 2006 (Cth) Section 280 – requires that a person carrying on activities in an offshore area under the permit, lease, licence, authority, or consent must carry out those activities in a manner that does not interfere with navigation or fishing (among others).	National Recovery Plan for Albatrosses and Petrels: no relevant actions. Wildlife Conservation Plan for Seabirds: Mitigate against impacts of light pollution around breeding colonies. Wildlife Conservation Plan for Migratory Shorebirds: no actions. National Light Pollution Guidelines for Wildlife recommend: 1. Always using Best Practice Lighting Design to reduce light pollution and minimise the effect on wildlife. 2. Undertaking an Environmental Impact Assessment for effects of artificial light on listed species for which artificial light has been demonstrated to affect behaviour, survivorship or reproduction.	The National Recovery Plan for the Orange-bellied Parrot recommends: Assess the risk of barriers, being illuminated structures or boats, on the probable migration route. Manage threat if the risk rating warrants action. National Light Pollution Guidelines for Wildlife recommend: 1. Always using Best Practice Lighting Design to reduce light pollution and minimise the effect on wildlife. 2. Undertaking an Environmental Impact Assessment for effects of artificial light on listed species for which artificial light has been demonstrated to affect behaviour, survivorship or reproduction.	Conservation Management Plan for the Blue Whale states that anthropogenic noise in BIAs will be managed such that any blue whale continue to utilise the area without injury, and is not displaced from a foraging area. DAWE (2021a) details that underwater anthropogenic noise should not: • Stop or prevent any blue whale from foraging. • Cause any blue whale to move on when foraging. • Stop or prevent any blue whale from entering a foraging area.	Draft National Recovery Plan for the Southern Right Whale: Actions within and adjacent to southern right whale BIAs and habitat critical to the survival of southern right whales should demonstrate that is does not prevent any southern right whale from utilising the area or cause injury (PTS, TTS) and/or disturbance. NOTE: Legal definition of 'Should' means expected course of action or policy to be followed unless inappropriate for a particular circumstances. NOTE: No habitat critical to the survival of southern right whales have been identified.
Baseline Environment Condition	Fisheries overlap with existing shipping channel and area with existing oil and gas activity. Fisheries in the area historically have sustainable stock status.	Existing lighting in the area includes fishing vessels, shipping traffic, existing offshore oil and gas platforms and coastal developments. The shipping channel for	The orange-bellied parrot migratory route is within the shipping channel for vessels coming from Melbourne to Tasmania - one of the busiest shipping routes in offshore Australia.	The BIAs overlap existing shipping channel, area of high commercial fishing effort, and existing oil and gas activity.	The BIAs overlap existing shipping channel, area of high commercial fishing effort, and existing oil and gas activity.

Aspect	Interaction with Other Users		Light	Underwater Sound	
Receptor	**Commercial fishers**	**Seabirds and Shorebirds**	**Orange-bellied Parrot**	**Blue Whale**	**Southern Right Whale**
		vessels coming from Melbourne to Tasmania is one of the busiest shipping routes in offshore Australia.			
Acceptable Level	Commercial fishers are not economically disadvantaged as a result of oil and gas activities in the offshore Otway and Bass Basins.	Cumulative light does not impact breeding for seabirds, or roosting colonies for shorebirds, or populations of other species that forage in the area.	Light from cumulative sources does not affect migration of the orange-bellied parrot at a population level.	The activity will be carried out in a manner that will not be inconsistent with the Conservation Management Plan for the Blue Whale such that blue whales can continue to utilise the area without injury and [are] not displaced from a foraging area.	The activity will be carried out in a manner that will not be inconsistent with the draft National Recovery Plan for the Southern Right Whale (DCCEEW 2022a) such that actions within and adjacent to southern right whale BIAs should demonstrate that it does not prevent any southern right whale from utilising the area or cause injury (TTS and PTS) and/or disturbance.
Other Reasonably Foreseeable Projects/ Activities Relevant to Aspect	SESSF: Commonwealth Trawl Sector Otter Board, SESSF: Commonwealth Trawl Sector Danish-seine and Southern Squid Jig Fishery potential cumulative impact from exclusion zones associated with: • One seismic survey occurring concurrently with drilling/P&A activities and/or Project installation activities. • Consecutive drilling/P&A activities and/or Project installation activities. • Project infrastructure. Victorian Giant Crab and Southern Rock Lobster Fisheries potential cumulative impact from exclusion zones associated with: • Two successive seismic surveys. • One seismic survey occurring concurrently with drilling/P&A activities and/or Project installation activities. • Consecutive drilling/P&A activities and/or Project installation activities. • Project infrastructure.	Potential for overlap with foraging BIAs and shoreline breeding and roosting areas from a single seismic survey, single drilling operation and installation or IMR activities and sequential activities. For drilling this would be a rig with one vessel present at a drill location and one vessel transiting to port, for a seismic survey would be up to three vessels and for installation or IMR would be up to two vessels.	The probable migration route is overlap by activity light EMBAs. No illuminated structures or vessels will occur within the probable migration route. Spatial: Potential overlap between Regia seismic and 1 drilling activity with light EMBA overlapping the route - for one season (while seismic is occurring). Temporal: Consecutive drilling operations over an extended period of time may have light EMBAs that overlap the probable migration route.	With the current uncertainty on the timing of some other projects and the distance of underwater sound EMBAs, there is the potential for cumulative impact if the following occur within the migration BIA during the biologically relevant periods (nominally November to June): • Overlap between one seismic survey and one drilling activity for one season. • Consecutive drilling/P&A activities over a number of seasons. • Consecutive seismic surveys in one season or over a number of seasons.	Cumulative impacts from Beach's activities to the southern right whale reproduction BIA are not predicted as the Beach sound EMBAs do not overlap with this area. With the current uncertainty on the timing of some other projects and the distance of underwater sound EMBAs, there is the potential for cumulative impact if the following occur within the migration BIA during the biologically relevant periods (nominally April - October): • Overlap between one seismic survey and one drilling activity for one season. • Consecutive drilling/P&A activities over a number of seasons.
Description of Cumulative Impact (including spatial/temporal extent)	Commercial fishers may potentially be displaced within relevant Fishery Management Areas in the offshore Otway Basin by the proposed Project and other reasonably foreseeable seismic surveys and drilling/P&A activities. Drilling, seismic, installation and IMR activity exclusions will only apply while the activity is being undertaken and a 500 m exclusion zone will apply to wells and subsea infrastructure. Beach has undertaken previous drilling, installation, IMR and Operations in the area with little displacement to commercial fishers based on the consultation and notification controls implemented that will also be applied to the Project.	Potential for cumulative impacts associated within foraging BIAs and shoreline breeding and roosting areas from operational lighting associated with: • Drilling - rig with one vessel present at a drill location and one vessel transiting to port. • Seismic survey - up to three vessels. • Installation or IMR - up to two vessels. Though 20 km is used for operational lighting for the impact assessment all vessels and the rig will have a Light Management Plan restricting the amount of light that is emitted.	For seismic, cumulative impacts from light emissions on the probable migration route would be of short duration only when acquiring in the eastern side of the area at night, concurrently with a single drilling operation. Seismic program is limited to a maximum of 90 days, with 60 days of acquisition. Temporal: Light EMBA from a single drill rig overlapping varying spatial extents of the probable migration route over a period of years. Beach has been operating in the Otway and Bass Basins and undertaking similar activities to the Project activities with no evidence of orange-bellied parrot presence recorded. Other operators including previous seismic surveys have also not had evidence of orange-bellied	Without appropriate detection and actions in place there is the potential that blue whales could be exposed to underwater sound from two sources (seismic and drilling) within the foraging BIA that could result in them expending more energy to move away from the sound source to forage or restrict the area of foraging. This could also occur for consecutive years whilst drilling/P&A activities are undertaken within the Otway and Bass Basins. Cumulative impacts resulting in an increase in the likelihood of PTS and TTS for foraging blue whales is not predicted	Without appropriate detection and actions in place there is the potential that southern right whales could be exposed to underwater sound from two sources (seismic and drilling) within the migration BIA that could result in them expending more energy to move away from the sound source when migrating to and from coastal breeding areas. This could also occur for consecutive years whilst drilling/P&A activities are undertaken within the Otway and Bass Basins. Cumulative impacts resulting in an increase in the likelihood of PTS and TTS for a migrating southern right whale is not predicted due to the small distances to the

Aspect	Interaction with Other Users	Light		Underwater Sound	
Receptor	**Commercial fishers**	**Seabirds and Shorebirds**	**Orange-bellied Parrot**	**Blue Whale**	**Southern Right Whale**
		Flaring may be undertaken but cumulative impacts are unlikely due to the short term nature (1 – 2 days) that it will be undertaken. The cumulative impact of light emissions from petroleum activities would be very low in comparison to the light emissions associated with existing shipping and fishing operations within the Otway and Bass areas. In addition, the majority of these vessels are not required to operate in accordance with a Light Management Plan.	parrot presence recorded. In addition orange-bellied parrot numbers continue to increase. The cumulative impact of light emissions from petroleum activities would be very low in comparison to the light emissions associated with existing shipping and fishing operations within the migration route. In addition, the majority of these vessels are not required to operate in accordance with a Light Management Plan.	due to the small distances to the PTS and TTS noise criteria for drilling activities.	PTS and TTS noise criteria for drilling activities.
Certainty of Assessment	Given the intensity of fishing in the area, and the overlap of fishery management areas with the proposed activities of multiple titleholders, the assessment of cumulative impacts is made with a high level of predictability and certainty.	Beach has been operating in the Otway and Bass Basins and undertaking similar activities to the Project activities without incident to date of birds being attracted to rigs or vessels. Other operators including previous seismic surveys have also not had incidents of bird attraction. Thus, the assessment of cumulative impacts is made with a high level of predictability and certainty.	There is no published information available on the sensitivity of the orange-bellied parrot to light, and only anecdotal evidence exists regarding the impact of barriers to migration (DELWP 2016a). This introduces some uncertainty into the assessment of cumulative impacts.	There is a high level of predictability and certainty in the limited potential for cumulative impacts, given the requirements in place for each activity to prevent impacts.	There is a high level of predictability and certainty in the limited potential for cumulative impacts, given the requirements in place for each activity to prevent impacts.
Existing Control Measures	A single MODU has been contracted to conduct drilling/P&A activities in the region, mitigating the potential for concurrent impacts from these activities. Titleholders overlapping fishery management areas with recorded fishing intensity are required to consult with affect parties and typically have ongoing notifications processes and a compensation protocol in place to ensure fishers are no worse off as a result of their proposed activity. CM03: Consultation for Implementation of EP CM04: Fair Ocean Access Procedure	A single rig has been contracted to conduct drilling/P&A activities in the region, mitigating the potential for concurrent impacts from these activities. Titleholders with light EMBAs overlapping bird foraging, breeding, or roosting BIAs or where behaviours are identified are required to have a light management plan that meets the requirements of the National Light Pollution Guidelines. CM07: Light Management Plan	A single rig has been contracted to conduct drilling/P&A activities in the region, mitigating the potential for concurrent impacts from these activities. Titleholders with Light EMBAs overlapping or adjacent to the orange-bellied parrot migration route are required to have a light management plan that meets the requirements of the National Light Pollution Guidelines. CM07: Light Management Plan	A single rig has been contracted to conduct drilling/P&A activities in the region, mitigating the potential for concurrent impacts from these activities. Titleholders are required to undertake their activity in a manner that is not inconsistent with the in force Conservation Management Plan for the Blue Whale. CM08: Whale Management Procedure	A single rig has been contracted to conduct drilling/P&A activities in the region, mitigating the potential for concurrent impacts from these activities. Titleholders are required to undertake their activity in a manner that is not inconsistent with the in force Conservation Management Plan for Southern Right Whale. CM08: Whale Management Procedure
Additional Control Measures / Environmental Performance Standards	Beach will undertake to continue to work with other titleholders, fishing associations and fishers, to design an application process for compensation that minimises the potential for cumulative impacts associated with commercial fishers having to make multiple applications to multiple titleholders.	Beach will work with other titleholders with the aim of minimising the potential for cumulative impacts associated with light emissions, should activity timings overlap biologically important periods for light sensitive species. Observations, incidents, and opportunities for improvement regarding light management and bird interactions will be reported to other petroleum titleholders.	Beach will work with other titleholders with the aim of minimising the potential for cumulative impacts associated with light emissions, should activity timings overlap biologically important periods for light sensitive species. Observations, incidents, and opportunities for improvement regarding light management and bird interactions will be reported to other petroleum titleholders.	Beach will work with other the titleholders with the aim of minimising the potential for cumulative impacts associated with underwater sound, should activity timings overlap biologically important periods for blue whales. Observation, incidents, and opportunities for improvement regarding underwater sound management and whale interactions will be reported to other petroleum titleholders.	Beach will work with other the titleholders with the aim of minimising the potential for cumulative impacts associated with underwater sound, should activity timings overlap biologically important periods for southern right whales. Observation, incidents, and opportunities for improvement regarding underwater sound management and whale interactions will be reported to other petroleum titleholders.
Residual Cumulative Consequence	**Minor (1)**	**Minor (1)**	**Minor (1)**	**Minor (1)**	**Minor (1)**

Aspect	Interaction with Other Users	Light		Underwater Sound	
Receptor	**Commercial fishers**	**Seabirds and Shorebirds**	**Orange-bellied Parrot**	**Blue Whale**	**Southern Right Whale**
ALARP Achieved	Yes - The residual consequence is lower order – Minor (1). Additional control measures were considered and adopted to minimise the consequence of impacts and are considered effective and appropriate to the predicted cumulative environmental impact.	Yes - The residual consequence is lower order – Minor (1). Additional control measures were considered and adopted to minimise the consequence of impacts and are considered effective and appropriate to the predicted cumulative environmental impact.	Yes - The residual consequence is lower order – Minor (1). Additional control measures were considered and adopted to minimise the consequence of impacts and are considered effective and appropriate to the predicted cumulative environmental impact.	Yes - The residual consequence is lower order – Minor (1). Additional control measures were considered and adopted to minimise the consequence of impacts and are considered effective and appropriate to the predicted cumulative environmental impact.	Yes - The residual consequence is lower order – Minor (1). Additional control measures were considered and adopted to minimise the consequence of impacts and are considered effective and appropriate to the predicted cumulative environmental impact.
Acceptable Level Achieved	Yes – Following completion of the CIA process, the residual lower order – Minor (1) consequence is considered acceptable because: •Good practice controls are defined and will be implemented. •The activities will be managed in accordance with relevant company, Commonwealth, international, and Industry standards, guidelines, and requirements.	Yes – Following completion of the CIA process, the residual lower order –Minor (1) consequence is considered acceptable because: • Limited spatial extent of effect compared to area available for foraging. Most species forage during daylight. • The National Recovery Plan for Albatrosses and Petrels states that marine infrastructure interactions, including those associated with artificial light, are classified as having no risk category priority and affecting 'Nil' species in Australian jurisdiction. • The Drilling Program light EMBA does not overlap the shoreline of the Wedge-tailed shearwater breeding BIA. This species is not listed as threatened and periodic changes in ambient light is unlikely to cause behavioural changes or result in injury/mortality to this species. • Good practice controls are defined and will be implemented. • Adequate procedures and guidelines are in place to minimise impacts. • The activities will be managed in accordance with relevant company, Commonwealth, international, and Industry standards, guidelines, and requirements.	Yes – Following completion of the CIA process, the residual lower order – Minor (1) consequence is considered acceptable because: • The impact of light emissions from a seismic vessel overlapping the light emission from a rig are predicted to result in increases in ambient light that are short-term, fully recoverable and do not represent illuminated structures or boats within the migration route. • Light from drilling activities will only occur from a single location, with limited overlap with the probable migration route and do not represent illuminated structures or boats within the migration route. • Good practice controls are defined and will be implemented. • Adequate procedures and guidelines are in place to minimise impacts. • The activities will be managed in accordance with relevant company, Commonwealth, international, and Industry standards, guidelines, and requirements.	Yes – Following completion of the CIA process, the residual lower order – Minor (1) consequence is considered acceptable because: • Titleholders are required to undertake their activity in a manner that is not inconsistent with the in force Conservation Management Plan for the Blue Whale. • Good practice controls are defined and will be implemented. • Adequate procedures and guidelines are in place to minimise impacts. • The activities will be managed in accordance with relevant company, Commonwealth, international, and Industry standards, guidelines, and requirements.	Yes – Following completion of the CIA process, the residual lower order – Minor (1) consequence is considered acceptable because: • Titleholders are required to undertake their activity in a manner that is not inconsistent with the in force Conservation Management Plan for Southern Right Whale. • Good practice controls are defined and will be implemented. • Adequate procedures and guidelines are in place to minimise impacts. • The activities will be managed in accordance with relevant company, Commonwealth, international, and Industry standards, guidelines, and requirements.

7.15 Environmental Performance Outcomes, Standards and Measurement Criteria

As detailed in the OPGGS(E)R the EP must set out the EPOs for the activity against which the performance of the titleholder in protecting the environment is to be measured. In addition, the EP must set EPSs for the control measures identified in the impact and risk assessment and include measurement criteria that the titleholder will use to determine whether each EPO and EPS is met.

The EPOs for the Drilling Program are listed below with the controls and associated EPS and measurement criteria detailed in Table 7-23.

- EPO1: Undertake the activity in a manner that will not interfere with other marine users to a greater extent than is necessary for the exercise of right conferred by the titles granted.
- EPO2: No death or injury to listed threatened or migratory species from the activity.
- EPO3: Biologically important behaviours can continue while the activity is being undertaken.
- EPO4: Anthropogenic noise in biologically important areas will be managed such that:
    - Any blue whale continues to utilise the area without injury, and is not displaced from a foraging area.
    - It does not prevent any southern right whale from utilising the area or cause injury (TTS and PTS) and/or disturbance.
- EPO5: No substantial reduction of air quality within local airshed caused by atmospheric emissions produced during the activity.
- EPO6: Seabed and associated biota disturbance will be within the Operational Areas.
- EPO7: No impact to submerged cultural heritage*.
- EPO8: No impact to water quality at a distance > 500 m from the vessel or rig from planned marine discharges.
- EPO9: No introduction of a known or potential invasive marine species.
- EPO10: No unplanned discharge of waste to the marine environment.
- EPO11: No spills of chemicals or hydrocarbons to the marine environment.

* In addition to EPO7, all the other EPOs define the performance of Beach in protecting First Nations Cultural Values and Sensitivities as identified in Section 6.6.3.

Table 7-23: Environmental Performance Standards and Measurement Criteria

Environmental Performance Outcome	Control Measure #	Environmental Performance Standard	Measurement Criteria
• EPO1: Undertake the activity in a manner that will not interfere with other marine users to a greater extent than is necessary for the exercise of right conferred by the titles granted. • EPO2: No death or injury to listed threatened or migratory species from the activity. • EPO3: Biologically important behaviours can continue while the activity is being undertaken. • EPO4: Anthropogenic noise in biologically important areas will be managed such that: ○ Any blue whale continues to utilise the area without injury, and is not displaced from a foraging area. ○ It does not prevent any southern right whale from utilising the area or cause injury (TTS and PTS) and/or disturbance. • EPO5: No substantial reduction of air quality within local airshed caused by atmospheric emissions produced during the activity. • EPO8: No impact to water quality at a distance > 500 m from the vessel or rig from planned marine discharges. • EPO10: No unplanned discharge of waste to the marine environment. • EPO11: No spills of chemicals or hydrocarbons to the marine environment.	CM01: Marine Assurance Process	The rig and vessels will meet relevant maritime laws and includes pre-commencement rig and vessel inspections of class certification requirements under the Navigation Act 2012 and associated Marine Orders, including but not limited to: • Marine Order 21 Safety and Emergency Arrangements. • Marine Order 27 Safety of Navigation and Radio Equipment. • Marine Order 30 Prevention of Collisions. • Marine Order 31: SOLAS and non-SOLAS Certification. • Marine Order 42 Carriage, Stowage and Securing of Cargoes and Containers. • Marine Order 57: Helicopter Operations. • Marine Order 70 Seafarer Certification. • Marine Order 91 Marine Pollution Prevention - Oil • Marine Order 95 Marine Pollution Prevention – Garbage. • Marine Order 96: Marine Pollution Prevention – Sewage. • Marine Order 97 Marine Pollution Prevention – Air Pollution. • Marine Order 98: Marine Pollution – Anti-fouling Systems.	Bunker receipts showing use of very low sulphur fuel. Ship Energy Efficiency Management Plan Oil record book Garbage record book Certification documentation Vessel and rig inspection
		Oil contaminated water shall be treated via a MARPOL (or equivalent) approved oily water separator and only discharge if oil content less than 15 ppm.	Oil record book Vessel and rig inspection
		If ODS are present on the rig or vessels, the rig or vessel will have ODS handling procedures as per MARPOL Annex VI, including maintenance of ODS record book where rechargeable systems containing ODS are recharged or repaired.	ODS handling procedures ODS record book Vessel and rig inspection
		Rig and vessels will have Preventative Maintenance System that provides a status on the maintenance of equipment and detailed manufacturer's specification on maintenance procedures for: • Equipment detail as a control in this EP will be inspected to ensure effective operation. • Power generation and propulsion systems on the MODU and vessels will be inspected to ensure efficient operation.	Preventative Management System records Vessel and rig inspection
		Materials and equipment that have the potential to spill onto the deck or marine environment will be stored within a contained area.	Vessel and rig inspection
		Waste or materials with potential to be windblown shall be stored in covered containers.	Vessel and rig inspection
		Rig and vessels shall have a SMPEP (or equivalent appropriate to class) which is: • Implemented in the event of a spill to deck or marine environment. • Tested as per the vessel test schedule. Spill response kits will be available and routinely checked to ensure adequate stock is maintained.	SMPEP Vessel and rig inspection Vessel and rig exercise schedule
• EPO1: Undertake the activity in a manner that will not interfere with other marine users to a greater extent than is necessary for the exercise of right conferred by the titles granted. • EPO2: No death or injury to listed threatened or migratory species from the activity.	CM02: Vessel and Rig Operating Procedures	Bulk solids transferred in accordance with bulk transfer procedures to reduce the risk of an unintentional release bulk product (powder) to sea during tank venting. The procedures include standards for: • Certified equipment with confirmed integrity (e.g. hose and valves). • Transfer process (e.g. safety, communication, monitoring, inventory, emergency shut down procedures, procedural documents, and spill incident details).	Bulk transfer procedures
		Bunkering and bulk liquids will be transferred in accordance with bulk transfer procedures to reduce the risk of an unintentional release to sea during transfer. The procedures include standards for: • Certified equipment with confirmed integrity (e.g. hose and valves). • Transfer process (e.g. safety, communication, monitoring, inventory, emergency shut down procedures, procedural documents, and spill incident details)	Bulk transfer procedures

Environmental Performance Outcome	Control Measure #	Environmental Performance Standard	Measurement Criteria
• EPO3: Biologically important behaviours can continue while the activity is being undertaken. • EPO5: No substantial reduction of air quality within local airshed caused by atmospheric emissions produced during the activity. • EPO10: No unplanned discharge of waste to the marine environment. • EPO11: No spills of chemicals or hydrocarbons to the marine environment.		A 500 m radius Petroleum Safety Zone (PSZ) will be published in the Government Notices Gazette for each new location for the duration of the drilling and will remain in place for those wells which are suspended for future production. A 2 km radius cautionary zone will be in place around the rig when on location and will be monitored by a support vessel.	PSZ gazette Daily report
		At least one support vessel will remain with the rig during the Drilling Program, weather permitting.	Daily report
		Vessel speeds within the Operational Area will be restricted to ≤ 10 knots.	Vessel log
		All lifting gear used for deployment and retrieval of equipment over the rig and vessels is load rated for the working load.	Lifting gear rating and load records
		If deemed safe and effective to do so, support vessels can assist in the recovery of lost materials or waste.	Daily report
		AMSA JRCC and other marine users will be notified in the event of loss of materials with potential to affect safe navigation.	Notification records
• EPO1: Undertake the activity in a manner that will not interfere with other marine users to a greater extent than is necessary for the exercise of right conferred by the titles granted. • EPO7: No impact to submerged cultural heritage.	CM03: Consultation for Implementation of EP	As per Section 4.1.16 Beach will undertake consultation for the implementation of the EP which will include at a minimum: • Notification to all relevant person regarding acceptance of the EP by NOPSEMA. • Commencement of activities, exclusion zones, vessel details, pre-lay of anchors and buoys, movement of drilling rig to new locations, during activity and cessation notification requirements. • On-water communication processes, including SMS messages and radio communication. • Consultation with relevant First Nations groups (section 6.6.2) regarding identified cultural heritage and cultural landscapes in accordance with CM05: Seabed Survey. • Consultation with commercial fishing associations (and individual commercial fishers where identified) regarding well locations, the ongoing communication of Beach activities to their members, and applying CM04: Beach Fair Ocean Access Procedure.	Notification records Consultation records
• EPO1: Undertake the activity in a manner that will not interfere with other marine users to a greater extent than is necessary for the exercise of right conferred by the titles granted.	CM04: Beach Fair Ocean Access Procedure	The Beach Fair Ocean Access Procedure (Appendix D for overview) shall be implemented with fishers who have identified they fish in the area and have a commercial loss due to Beach's activities.	Consultation records
• EPO1: Undertake the activity in a manner that will not interfere with other marine users to a greater extent than is necessary for the exercise of right conferred by the titles granted. • EPO6: Seabed and associated biota disturbance will be within the Operational Areas. • EPO7: No impact to submerged cultural heritage.	CM05: Seabed Survey	A seabed survey will be undertaken prior to the commencement of the Drilling Program to allow for the consideration of the following in the final selection of well locations and drill rig position and location of mooring equipment: • Seabed habitat type to avoid areas of high relief outcrops, reefs or sponge beds that are likely to be associated with site-attached fish. • Shipwrecks and other maritime archaeological heritage. • Submerged cultural heritage and cultural landscapes. • Location of the Superloop Indigo Central telecommunications cable for wells in T/30P to avoid any impacts to the cable. • Location of unexploded ordinances. Data from seabed surveys will be provided to an appropriately qualified underwater archaeologist to identify submerged cultural heritage and landscapes and provide an Underwater Cultural Heritage Report to Beach. Beach will assess the report and identify any areas of overlap and potential risks from proposed activities defined in this EP. Beach will share relevant information and assessments from the Seabed Survey, relevant to submerged cultural heritage and landscapes with relevant First Nations groups as identified in Section 6.6.2. Should any submerged cultural heritage be identified, Beach will report the findings in accordance with the *Underwater Cultural Heritage Act* 2018, and will consult with the relevant First Nations groups (as identified in Section 6.6.2) and determine any exclusion areas or further cultural heritage management procedures that may be required. Should any potential submerged cultural landscapes be identified, in consultation with the qualified underwater archaeologist, Beach will assess the report and identify any areas of overlap and potential risks from proposed activities defined in this EP. Beach will also consult with relevant First Nations groups (see 6.6.2) and determine any exclusion areas or further cultural heritage management procedures that may be required.	Seabed survey records Consultation records Underwater Cultural Heritage Report Exclusion areas, if required Cultural heritage management procedures, if required

Environmental Performance Outcome	Control Measure #	Environmental Performance Standard	Measurement Criteria
• EPO1: Undertake the activity in a manner that will not interfere with other marine users to a greater extent than is necessary for the exercise of right conferred by the titles granted. • EPO6: Seabed and associated biota disturbance will be within the Operational Areas. • EPO7: No impact to submerged cultural heritage.	CM06: Drill Rig Mooring Plan CM09: Drilling Program	The following will be considered in the final selection of well locations, drill rig position and location of mooring equipment: • Seabed habitat type to avoid areas of high relief outcrops, reefs or sponge beds that are likely to be associated with site-attached fish. • Shipwrecks and other maritime archaeological heritage. • Submerged cultural heritage. • Location of the Superloop Indigo Central telecommunications cable for wells in T/30P to avoid any impacts to the cable. • Location of unexploded ordinances.	Drill Rig Mooring Plan Drilling Program final well locations
		Pre-laid anchors will have a surface buoy with navigation lighting and the position of the buoys will be included in the notification to AHS to be included in the AUSCOAST Warnings.	Drill Rig Mooring Plan
		Planned retrieval of all mooring equipment, including transponders, from the sea floor as soon as reasonably practicable within 3 months following the completion of the Drilling Program.	Drill Rig Mooring Plan
• EPO2: No death or injury to listed threatened or migratory species from the activity. • EPO3: Biologically important behaviours can continue while the activity is being undertaken.	CM07: Light Management Plan	Beach will contract a suitably qualified specialist to develop and support the implementation of a Light Management Plan for the rig and vessels, as per the National Light Pollution Guidelines for Wildlife. At a minimum the plan will cover: • Requirements to minimise non-essential lights and outward facing lights ensuring safety navigational lighting and safe work condition requirements are met. • Program for handling grounded birds. • Reporting requirements.	Light Management Plan Rid and vessel inspection

• EPO2: No death or injury to listed threatened or migratory species from the activity.
• EPO3: Biologically important behaviours can continue while the activity is being undertaken.
• EPO4: Anthropogenic noise in biologically important areas will be managed such that:
  ○ Any blue whale continues to utilise the area without injury, and is not displaced from a foraging area.
  ○ It does not prevent any southern right whale from utilising the area or cause injury (TTS and PTS) and/or disturbance.
	CM08: Whale Management Procedure	The Whale Management Procedure (Appendix H) will be implemented to minimise anthropogenic noise threats to relevant whale species.	Whale Management Procedure
			MMO records

• EPO1: Undertake the activity in a manner that will not interfere with other marine users to a greater extent than is necessary for the exercise of right conferred by the titles granted. • EPO8: No impact to water quality at a distance > 500 m from the vessel or rig from planned marine discharges.	CM09: Drilling Program	• Beach will implement an activity limitation where wells will not be located in water depths >400 m.	Drilling Program final well locations
		• Only water based drilling fluids will be used for the Drilling Program. • Solids control equipment consisting of shale shakers and centrifuges will be used once the riser is in place to reduce the concentration of drilling fluid on cuttings prior to discharge. • Shale shakers will be fitted with screens that meet American Petroleum Institute (API) standards for particle size cut points.	Drilling Program records
		Barite will have low concentrations of mercury and cadmium (less than 1 mg/kg and 3 mg/kg respectively).	Drilling Program records
		Residual water based drill fluids, brine, completion fluids, cement, barite and bentonite will be used for subsequent wells, provided to the next operator at the end of the program, or if these options are not feasible, discharged to the marine environment.	Drilling Program records

Environmental Performance Outcome	Control Measure #	Environmental Performance Standard	Measurement Criteria
		The BOP shall be routinely function and pressure tested in accordance with industry standards and preventative maintenance will be in accordance with manufacturer's specifications and in alignment with Drilling Contractors preventative maintenance system. Pre-operational function and pressure test to be conducted and may be witnessed by additional third-party prior to campaign.	BOP test records
		Prior to the commencement of the Drilling Program a register of suitable relief well rigs will be compiled and updated monthly during the program, or more frequently should any change in status of available rigs occur.	Relief Well Rig Register
• EPO2: No death or injury to listed threatened or migratory species from the activity. • EPO3: Biologically important behaviours can continue while the activity is being undertaken. • EPO5: No substantial reduction of air quality within local airshed caused by atmospheric emissions produced during the activity.	CM10: (Contingency) Well Testing Program	• Flaring will be limited to a maximum of 48 hours for one well as a contingency only (Yolla 7). • Initial flow will be conducted in good visibility conditions as per Beach WECS. • A check will be undertaken to ensure no birds are on or near to the flare boom prior to commencing flaring. • A flaring system and air compressors will be used to atomise hydrocarbons to minimise smoke during combustion and aid in the reduction of atmospheric emissions. • A minimum standard for the destruction efficiency of the flare will be specified in the minimum equipment requirements.	Well Testing Program records
• EPO5: No substantial reduction of air quality within local airshed caused by atmospheric emissions produced during the activity.	CM11: Procurement Vetting Process	Beach via its Procurement Vetting Process will assess suppliers emissions management and via this process support low emission vessels if available.	Procurement vetting records
• EPO8: No impact to water quality at a distance > 500 m from the vessel or rig from planned marine discharges.	CM12: Chemical Management Procedure	All chemicals that will or could be discharged to the marine environment must be assessed prior to use to ensure the lowest toxicity, most biodegradable and least accumulative chemicals are selected which meet the technical requirements of the application as per the Beach Chemical Management Procedure.	Chemical assessment records
• EPO11: No spills of chemicals or hydrocarbons to the marine environment.	CM13: Beach Offshore Oil Pollution Emergency Plan	Emergency spill response capability is maintained in accordance with the NOPSEMA accepted OPEP	OPEP Outcomes of internal audits and tests demonstrate preparedness
		Implement spill response in accordance with relevant EPOs and EPSs in the accepted OPEP.	EMT log
	CM14: Beach Offshore Operational and Scientific Monitoring Plan	Operational and scientific monitoring capability is maintained in accordance with the NOPSEMA accepted OSMP.	OSMP Outcomes of internal audits and tests demonstrate preparedness
	CM15: Well Engineering and Construction Management System	Drilling, completions, well testing and P&A planning and operations will be conducted in compliance with the Well Engineering and Construction Management System (WECS) that ensures: • Beach well activities are fit for purpose with operational and well life cycle risks managed to a level that is as low as reasonably practicable. • Changes are made in a controlled manner as per the Beach Management of Change Standard. • Appropriate standards are adhered to. • Sufficiently resourced and competent organisation is in place.	Well Engineering and Construction Management System implementation records
	CM16: Source Control Contingency Plan (SCCP), inclusive of Relief Well Plan	• Emergency spill response capability is maintained in accordance with the SCCP and Relief Well Plan. • The SCCP will be consistent with the International Oil and Gas Producers (IOGP) Report 594 - Subsea Well Source Control Emergency Response Planning Guide for Subsea Wells (2019). • Relief Well Plan will be developed in line with industry guidelines, i.e. UK Offshore Energies (OEUK)	SCCP Relief Well Plan Outcomes of internal audits and tests demonstrate preparedness
	CM17: NOPSEMA Accepted Well Operations Management Plan	Well integrity shall be maintained in accordance with the NOPSEMA accepted Well Operations Management Plan (WOMP).	NOPSEMA accepted WOMP

Environmental Performance Outcome	Control Measure #	Environmental Performance Standard	Measurement Criteria
	CM18: NOPSEMA accepted Rig Safety Case	The Offshore Petroleum and Greenhouse Gas Storage (Safety) Regulations 2009 (OPGGS(S)) set out the requirements for the contents of safety cases. The rig requires an Australian Safety Case detailing the control in place to prevent a major accident event. The Rig Safety Case: • Identifies the hazards and risks. • Describes how the risks are controlled. • Describes the safety management system in place to ensure the controls are effectively and consistently applied.	NOPSEMA accepted Rig Safety Case
• EPO9: No introduction of a known or potential invasive marine species.	CM19: Beach Domestic IMS Biofouling Risk Assessment Process	Drill rig and support vessels mobilised from domestic waters to undertake activities within the Operational Areas will complete the Beach Domestic IMS Biofouling Risk Assessment Process as detailed in the Beach Introduced Marine Species Management Plan (S400AH719916) prior to the initial mobilisation into the Operational Areas.	Domestic IMS Biofouling Risk Assessment records

8 Implementation Strategy

The OPGGS(E)R requires that the EP must contain an implementation strategy for the activity.

The Beach Operations Excellence Management System (OEMS) will be used to govern the activity. The OEMS provides guidance on how Beach will meet the requirements of its Environmental Policy (Figure 8-1). The Beach OEMS has been developed considering Australian/New Zealand Standard ISO 14001:2016 Environmental Management Systems. The OEMS is an integrated management system and includes all HSE management elements and procedures.

8.1 Operations Excellence Management System

The OEMS documents Beach's Environmental Policy, 11 OEMS Elements (the Elements) and 30 OEMS Standards (the Standards). It provides a management framework for achieving the requirements in a systematic way but allows flexibility to achieve this in a manner that best suits the business. The OEMS is aligned with the requirements of recognised international and national standards including:

- ISO 14001 (Environmental Management)
- OHSAS 18001 (Occupational Health and Safety)
- ISO 31000 (Risk Management)
- AS 4801 (Occupational Health and Safety Management Systems)

At the core of the OEMS are the 11 Elements and associated Standards that detail specific performance requirements that incorporate all the requirements for the implementation of the Environmental Policy (Figure 8-1) and management of potential HSE impacts and risks (Figure 8-2, Table 8-1). The Elements, via the nominated expectations, sponsor 30 Beach OEMS Standards, which provide more granular minimum compliance rule sets under which the company operates. At the business level, the system is complemented by asset and site procedures and plans such as this EP.

The application of OEMS Elements and Standards relevant to the activity and the requirements of the OPGGS(E)R are described in the following sections.

Whilst Beach is the titleholder for the Drilling Program, the rig and vessel contractor maintains operational control as per the requirements of their management system.

beach

Environment Policy

Objective

Beach is committed to conducting operations in an environmentally responsible and sustainable manner.

Strategy

To achieve this, Beach will:

- Comply with relevant environmental laws, regulations, and the Beach Operations Excellence Management System which is the method by which Beach identifies and manages environmental risk.
- Establish environmental objectives and targets, and implement programs to achieve them that will support continuous improvement;
- Identify, assess and control environmental impacts of our operations by proactive management of activities and mitigation of impacts;
- Ensure that incidents, near misses, concerns and complaints are reported, investigated and lessons learnt are implemented;
- Inform all employees and contractors of their environmental responsibilities including consultation and distribution of appropriate environmental management guidelines, regulations and publications for all relevant activities;
- Efficiently use natural resources and energy, and engage with stakeholders on environmental issues; and
- Publicly report on our environmental performance.

Application

This policy applies to all personnel associated with Beach activities.

Morné Engelbrecht
Chief Executive Officer
April 2023

Figure 8-1: Beach's Environmental Policy

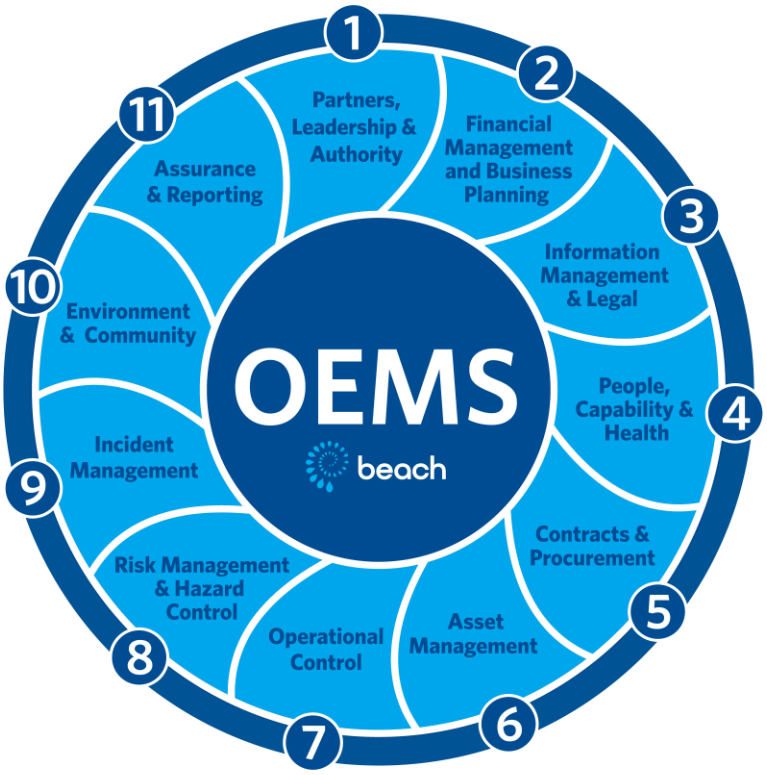

Figure 8-2: Beach OEMS

Table 8-1: Beach OEM Elements and Standards

Element		Standard
1	Partners, Leadership and Authority	Leadership Standard
		Technical Authority Standard
		Joint Venture Management Standard
2	Financial Management and Business Planning	Integrated Planning Standard
		Phase Gate Standard
		Hydrocarbon Resource Estimation and Reporting Standard
		Financial Management Standard
3	Information Management and Legal Requirements	Regulatory Compliance Standard
		Document Management Standard
		Information Management Standard
4	People, Capability and Health	Training and Competency Standard
		Health Management Standard
5	Contracts and Procurement	Contracts and Procurement Standard
		Transport and Logistics Standard
6	Asset Management	Asset Management Standard
		Maintenance Management Standard
		Well Integrity Management Standard
		Well Construction Management Standard
		Project Management Standard
7	Operational Control	Operational Integrity Standard
		Process Safety Standard
		Management of Change Standard
8	Risk Management and Hazard Control	Risk Management Standard
		Safe Systems of Work
		Emergency and Security Management Standard
9	Incident Management	Incident Management Standard
10	Environment and Community	Environment Management Standard
		Community Engagement Standard
11	Assurance and Reporting	Sustainability Standard
		Assurance Standard

8.2 Responsibilities of Employees and Contractors

8.2.1 Roles and Responsibilities

Element 1 Partnerships, Leadership and Authority focuses on ensuring the organisation is equipped, structured, and supported to ensure a healthy, efficient, and successful company. Communications with internal and external bodies, including joint venture partners, is essential to delivering successful projects and operations. The leadership styles and actions demonstrated within Beach will influence the performance of all staff and contractors. Clear levels of authority are necessary to remove organisational ambiguity and to support effective decision making.

Beach's Chief Operating Officer has the ultimate responsibility for ensuring that Beach has the appropriate organisation in place to meet the commitments within this EP. However, the Drilling Manager has the responsibility and delegated authority to ensure that adequate and appropriate resources are allocated to comply with OEMS and this EP.

The roles responsible for the implementation, management and review of this EP are detailed in Table 8-2.

Roles and responsibilities for an oil pollution emergency response are described in the OPEP.

Table 8-2: Roles and Responsibilities for Key Role for the EP Implementation

Role	Responsibilities
Onshore	
Chief Operating Officer	• Responsible for HSE performance of all Beach activities. • Ensures policies and systems are in place to guide the company's environmental performance. • Ensures adequate resources are available for the safe operation of all facilities and operations. • Ensures that the OEMS continues to meet the evolving needs of the company.
Drilling Manager	Ensures: • Compliance with the Environment Policy, regulatory and other requirements, and this EP. • Whale Management Procedure is implemented, records obtained, and reporting undertaken. • Records associated with the Drilling Program are maintained as per Section 8.6.2. • Personnel who have specific responsibilities pertaining to the implementation of this EP or Oil Pollution Emergency Plan (OPEP) know their responsibilities and are competent to fulfil their designated role. • Assurance Processes as detailed in Section 8.3.2 are undertaken to confirm that control measures detailed in the EP are effective in reducing the environmental risks of the Drilling Program to ALARP and acceptable levels, and EPOs and EPSs are continually met. • Environmental impacts and risks associated with the Drilling Program have been identified and any new or increased impacts or risks are managed via the Management of Change process detailed in Section 8.3.4. • Incidents are managed and reported as per Section 8.3.1. • Leads the investigation and reporting of any environmental incidents. • EP Performance Report is submitted to NOPSEMA as per Section 8.3.7.

Role	Responsibilities
	• Changes to equipment, systems, and documentation where there may be a new or change to an environmental impact or risk or a change that may impact the EP are assessed using the Management of Change process detailed in Section 8.3.4. • Oil spill response arrangements are tested as per the OPEP. • Audits and inspections are undertaken in accordance with Section 8.3.3.
Beach Drilling Superintendent	• Drilling Program is carried out in accordance with regulatory requirements and this EP. • Ensure the Whale Management Procedure is communicated to all MMOs, Beach Senior Drilling Supervisor, Beach personnel offshore and all 3rd party and drilling contractor personnel on the rig, all helicopter crew and all Vessel Captains and vessel crew. • Rig personnel are competent to fulfil their designated role. • HSE issues are communicated via systems such as the daily report and daily pre-start meetings. • Environmental incidents are managed and reported as per Section 8.3.1. • Emissions and discharges identified in Section 8.3.8 are recorded, reviewed, and provided to the Drilling Manager. • Drilling Manager is informed of any changes to equipment, systems, and documentation where there may be a new or change to an environmental impact or risk or a change that may impact the EP as per Section 8.3.4. • Weekly rig inspections are undertaken to ensure ongoing compliance with the EP as per Section 8.3.3 and communicate outcome and any non-conformance to Drilling Manager.
Head of Environment	• Ensures this EP is revised as required. • Whale Management Procedure Document Owner. Accountable to define the requirements of the business process, ensures appropriate performance metrics are defined and reviewed, tracks lessons learned, and drives continuous improvement. • Reviews EP audits. • Reviews and approves reportable incident reports to the regulators. • Reviews changes to operations for their environmental and regulatory implications.

Drilling Program Environment Advisor	• Maintains ongoing communications with the Drilling Manager regarding regulatory requirements and environmental management in general.
	• Prepares environmental inductions and training packages.
	• Monitors environmental performance against this EP.
	• Undertakes Assurance Processes as detailed in Section 8.3.2 to confirm that control measures detailed in the EP are effective in reducing the environmental risks of the Drilling Program to ALARP and acceptable levels, and the EPOs and EPSs are continually met.
	• In relation to the Whale Management Procedure:
	  ◦ Coordinate the training and implementation of the Whale Management Procedure offshore.
	  ◦ Ensures the requirements for the implementation of the Whale Management Procedure are in place prior to the commencement of the Drilling Program.
	  ◦ Reviews the MMO daily report to ensure detection and actions meet the requirements of the Whale Management Procedure.
	  ◦ Coordinates and documents the review of effectiveness and compliance with the Whale Management Procedure.
	  ◦ Forwards report detailing marine mammal sightings, actions taken as per the Whale Management Procedure, and reasons actions not taken to relevant persons who requested access to this information.

Role	Responsibilities
	◦ Forwards record of marine mammal sightings to DCCEEW Australian Marine Mammal Centre Division. • Prepares and submits monthly recordable incident reports to the regulators. • Prepares reportable incident reports for submission to the regulators. • Supports the Management of Change (MoC) process with regard to environmental issues. • Supports the investigation and reporting of any environmental incidents. • Prepares and submits reportable incident reports to the regulators. • Reviews changes to the Drilling Program with the Head of Environment.
Community Relations Manager	• Ensure that relevant persons (as defined in Section 4) are consulted about the Drilling Program to allow the relevant person to make an informed assessment of the possible consequences of the activity on their functions, interests, or activities. • Ensure that any requests for updates about the activity that were identified during the EP preparation consultation phase are implemented. • Ensure consultation for implementation of the EP (Section 4.16) is undertaken. • Maintains a record of stakeholder consultation including how any objection or claim relevant to the Drilling Program was assessed and communicated to the relevant person. • Reports stakeholder objections or claims to the Drilling Manager and Drilling Program Environment Advisor for assessment. • Keeps relevant persons informed of emergency events that may impact their functions or interests.
Offshore	
Rig Senior Drilling Supervisor	Ensures: • Drilling Program is carried out in accordance with regulatory requirements and this EP. • Rig personnel complete the Drilling Program induction. • Whale Management Procedure is implemented on the rig and: ◦ Maintain open communication with MMOs. ◦ Regularly (daily or more often as operational changes dictate) communicate the status of the activities (i.e. commencing, underway, or at Safe Point) to MMOs. ◦ Liaise with the MMO and decide whether actions within this procedure can safely be implemented and take action accordingly. ◦ Document reasons for not following this procedure and report same to the Beach Drilling Superintendent and the Beach Environmental Advisor. ◦ Provides input into the review of effectiveness and compliance with the Whale Management Procedure. • Rig personnel are competent to fulfil their designated role. • HSE issues are communicated via systems such as the daily report and daily pre-start meetings. • Environmental incidents are managed and reported as per Section 8.3.1. • Emissions and discharges identified in Section 8.3.8 are recorded and provided to the Drilling Superintendent. • Drilling Superintendent is informed of any changes to equipment, systems, and documentation where there may be a new or change to an environmental impact or risk or a change that may impact the EP as per Section 8.3.4. • Weekly rig inspections are undertaken to ensure ongoing compliance with the EP as per Section 8.3.3.
Vessel Master	Ensures:

Role	Responsibilities

	• Vessel operations are carried out in accordance with regulatory requirements and this EP.
	• Vessel personnel complete the Drilling Program induction.
	• Whale Management Procedure is implemented on the vessel and:
	  ◦ Maintains open communication with MMOs.
	  ◦ Liaise with MMO and decide whether actions within the Whale Management Procedure can safely be implemented and take action accordingly.
	  ◦ Documents reasons for not following the Whale Management Procedure and report same to the Beach Rig Senior Drilling Supervisor
	  ◦ Provides input into the review of effectiveness and compliance with the Whale Management Procedure.
	• Vessel personnel are competent to fulfil their designated role.
	• HSE issues are communicated via systems such as the daily report and daily pre-start meetings.
	• Emissions and discharges identified in Section 8.3.8 are recorded and provided to the Rig Drilling Supervisor.
	• Environmental incidents are reported to the Rig Drilling Supervisor within required timeframes as per Section 8.3.1.
	• Rig Drilling Supervisor is informed of any changes to equipment, systems, and documentation where there may be a new or change to an environmental impact or risk or a change that may impact the EP as per Section 8.3.4.
	• Oil spill response arrangements are in place and tested as per the vessel's SMPEP or equivalent.

Rig and vessel personnel	• Complete project induction. • Report hazards and/or incidents via company reporting processed. • Stop any task that they believe to be unsafe or will impact on the environment. • Immediately communicate whale sighting to MMOs.
Marine Mammal Observers (MMOs)	• Undertake observations and reporting in accordance with the Whale Management Procedure. • Provide advice to the Rig Drilling Supervisor and Vessel Master (or delegate) on the requirements of the Whale Management Procedure. • Provide input into the review of effectiveness and compliance with the Whale Management Procedure.

8.2.2 Competencies and Training

Element 4 People, Capability and Health focuses on ensuring the people within the business are fully equipped with the competencies required to perform their assigned duties and are physically and mentally prepared.

Each employee or contractor with responsibilities pertaining to the implementation of this EP shall have the appropriate training and competencies to fulfil their designated role.

To ensure that personnel are aware of the EP requirements for the Drilling Program all offshore personnel will complete a general induction, as a minimum. Records of completion of the induction will be recorded and maintained as per Section 8.6.2. The induction will at a minimum cover:

- Description of the environmental sensitivities and conservation values of the operational areas and surrounding waters.

- Controls to be implemented to ensure impacts and risks are of an acceptable level and ALARP.
- Requirement to follow procedures and use risk assessments/ job hazard assessments to identify environmental impacts and risks and appropriate controls.
- Requirements for interactions with fishers and/or fishing equipment.
- Requirement for responding to and reporting environmental hazards or incidents.
- Locations of known maritime and cultural heritage sites and the process to follow if a maritime and cultural heritage site is identified.
- Cultural Heritage sensitivities relating to the Operational Areas.
- Whale Management Procedure requirements including detection of whales and actions required.
- Lighting requirements including:
    - Turn off lights when not in use.
    - Close blinds/curtains.
    - Where feasible direct lighting inward/downward facing.
- Procedure for handling grounded birds and reporting requirements.
- Overview of emergency response and spill management plans.

In addition to the Drilling Program induction, each employee or contractor with specific responsibilities pertaining to the implementation of this EP shall be made aware of their responsibilities, and the specific control measures required to maintain environmental performance and legislative compliance.

8.2.3 Contracts and Procurement

Element 5 Contracts and Procurement addresses the acquiring of external services and materials, and the transportation of those materials. It ensures Beach's business interests are met while maintaining compliance with all legal obligations and retaining HSE performance as the top priority.

Beach undertakes a pre-qualification of all contractors in which their HSE systems are reviewed to ensure that the contractor's HSE management system (HSEMS) is adequate for meeting their legal obligations and has identified the significant risks and control measures related to the scope of work being undertaken for Beach. This process includes verifying evidence of HSEMS implementation.

Training and competency of contractor personal engaged to work on the Drilling Program shall be managed in accordance with the contractor's HSEMS (or equivalent).

Section 8.2.3 details how contractors will be assessed to ensure they have the capabilities and competencies to implement the control measures identified in Section 7.

8.2.4 Communications

The Drilling Manager has responsibility for ensuring that systems are in place to facilitate the communication of HSE issues. Communication is typically via the daily report and daily operations meetings; and through weekly HSE meetings.

The meetings are used to identify and communicate:

- Environmental Performance.
- Issues associated with implementation of the EP.
- Any proposed changes to equipment, systems, or methods of operation of equipment, where these may be HSE implications.
- Any proposals for the continuous improvement of environmental protection.

8.3 Monitoring and Reporting

Element 11 Assurance and Reporting, establishes that the company must apply the requirements of relevant policies, and the commitments detailed in the OEMS standards throughout its activities. An assurance process therefore exists to systematically quantify compliance with those commitments, and with the underlying procedures and systems. This Element also documents Beach's approach to sustainability and reporting company performance using established sustainability performance metrics.

The Assurance Management Standard describes the "Three Lines of Defence" assurance model employed by Beach to govern its activities and ensure compliance with its commitments and standards. The standard defines Beach's requirements for the establishment and management of risk-based assurance activities at all levels within the company. The assurance process establishes the adequacy and effectiveness of Beach's risk controls and quantifies the status of compliance against our obligations. It ensures the organisation proactively closes any gaps in performance so it can address those issues before harm is manifested. As such, the assurance programme identifies improvement opportunities in business processes and risk controls.

The Standard describes the need to have assurance plans across the business, and for the assurance activities to take place on multiple levels of the organisation. This approach collectively ensures the operational activities Beach perform are compliant with its procedures, standards and ultimately with governing policies and legislative obligations. The holistic results of the assurance programme are reportable to the Board and Committees.

8.3.1 Incident Reporting

Element 9 Incident Reporting defines how Beach classifies, investigates, reports, and learns from incidents. An incident is any unplanned event or change that results in potential or actual adverse effects or consequences to people, the environment, assets, reputation, or the community.

Standard 9.1 defines the requirement for incident notification, reporting and subsequent investigation requirements. It ensures that incident classification is applied consistently across the company, and that the appropriate level of investigation and approval authority is implemented. The standard describes the requirement for identifying and assigning remedial actions, and for communicating key

learnings throughout the business. As such, the standard also defines the requirement for adequate training for those persons involved in performing investigations.

The incident management standard requires that all HSE incidents, including near misses, are reported, investigated, and analysed to ensure that preventive actions are taken, and learnings are shared throughout the organisation.

Incident reports and corrective actions are managed using the Beach Incident Management System.

Reportable and recordable incidents are identified by the incident notification processes. In addition, recordable incidents are also identified as per the assurance processes detailed in Section 8.3.2.

As part of the review and investigation of incidents additional, or increased, environmental impacts or risks may be identified. These are managed as per the Management of Change process detailed in Section 8.3.4.

Notification and reporting requirements for environmental incidents to external agencies are provided in Table 8-3.

Table 8-3: Regulatory Incident Reporting

Requirement	Timing	Contact	Responsible Person
Recordable incident As defined within the OPGGS(E)R a recordable environmental incident is a breach of an EPO or EPS in the EP that applies to the activity that is not a recordable incident.			
As a minimum, the written monthly recordable report must include a description of: • all recordable incidents which occurred during the calendar month; • all material facts and circumstances concerning the incidents that the operator knows or is able to reasonably find out; • corrective actions taken to avoid or mitigate any adverse environmental impacts of the incident; and • corrective actions that have been taken, or may be taken, to prevent a repeat of similar incidents occurring. The OPGGS(E)R requires a recordable incident report to be submitted if there is a recordable incident, thus nil reports are not required.	Before the 15th day of the following calendar month	• NOPSEMA – submissions@nopsema.gov.au	Drilling Manager

Requirement	Timing	Contact	Responsible Person
Reportable incident As defined within the OPGGS(E)R, a reportable incident is an incident relating to the activity that has caused, or has the potential to cause, moderate to significant environmental damage. In the context of the Beach Environmental Risk Matrix moderate to significant environmental damage is defined as any incident of actual or potential consequence category Serious (3) or greater. These risks include: • Loss of well integrity resulting in a condensate spill or otherwise. • Vessel collision resulting in a loss of containment or otherwise. • Introduction of marine pests to the operational area. In addition the following that does not have an actual or potential consequence category Serious (3) or greater will be reported as a reportable incident: • Injury of death of a protected species.			
Notification The notification must contain: • all material facts and circumstances concerning the incident; • any action taken to avoid or mitigate the adverse environmental impact of the incident; and • the corrective action that has been taken or is proposed to be taken to stop control or remedy the reportable incident. As soon as practicable after notification of a reportable incident, a written record of the notification must be given to: • NOPSEMA (The Regulator) • NOPTA (Titles Administrator) • DEECA (Vic) (Department of Responsible State Minister for Vic titles) • Department of State Growth who has delegated to EPA Tasmania (Department of Responsible State Minister for Tas titles)	Within two hours of becoming aware of incident	• NOPSEMA – 1300 674 472 • NOPSEMA – submissions@nopsema.gov.au • DEECA ERR (Vic)– ERRChiefInspector@ecodev.vic.gov.au (0419 597 010) • EPA (Tas): incidentresponse@epa.tas.gov.au (1800 005 171) • NOPTA – reporting@nopta.gov.au	Drilling Manager
Written notification Verbal notification of a reportable incident to the regulator must be followed by a written report. As a minimum, the written incident report will include: • the incident and all material facts and circumstances concerning the incident;	Not later than 3 days after the first occurrence of the incident	• NOPSEMA – submissions@nopsema.gov.au	Drilling Manager

Requirement	Timing	Contact	Responsible Person
• actions taken to avoid or mitigate any adverse environmental impacts; • the corrective actions that have been taken, or may be taken, to prevent a recurrence of the incident; and • the action that has been taken or is proposed to be taken to prevent a similar incident occurring in the future.			
Written incident reports to be submitted to NOPTA, DEECA and EPA (Tas) (for incidents in Commonwealth waters).	Within 7 days of written report submission to NOPSEMA	• DEECA ERR (Vic)– ERRChiefInspector@ecodev.vic.gov.au (0419 597 010) • EPA (Tas): incidentresponse@epa.tas.gov.au (1800 005 171) • NOPTA – reporting@nopta.gov.au	Drilling Manager
Vessel spill to marine environment All discharges /spills or probable discharges/spills to the marine environment of oil or oily mixtures, or noxious liquid substances in the marine environment from vessels. Reporting info: http://www.amsa.gov.au/forms-and-publications/AMSA1522.pdf.	Verbal notification ASAP	Immediate notification by the Vessel Master to AMSA. Follow-up with Marine Pollution Report (POLREP). • Ph: 1800 641 792 • Email: rccaus@amsa.gov.au • AMSA POLREP: https://amsa-forms.nogginoca.com/public/	Vessel Master
Australian Marine Park (AMP) In the event an AMP may be exposed to hydrocarbons	Verbal notification ASAP	• Marine Park Compliance Duty Officer – 0419 293 465 Notification must be provided to the Director of National Parks (DNP) and include: • titleholder details • time and location of the incident (including name of marine park likely to be affected) • proposed response arrangements as per the OPEP (e.g. dispersant, containment, etc.) • confirmation of providing access to relevant monitoring and evaluation reports when available • contact details for the response coordinator. Note: DNP may request daily or weekly Situation Reports, depending on the scale and severity of the pollution incident.	EMT Lead (or delegate)

Requirement	Timing	Contact	Responsible Person
Vessel strike with cetacean	Within 72 hours	• DCCEEW – online National Ship Strike Database https://data.marinemammals.gov.au/report/shipstrike	Vessel Master
	ASAP for cetacean injury assistance	• DEECA Whale and Dolphin Emergency Hotline – 1300 136 017 • Seals, Penguins or Marine Turtles 136 186 (Mon-Fri 8am to 6pm) or AGL Marine Response Unit 1300 245 678.	Vessel Master / Drilling Program Environment Advisor
Injury to or death of EPBC Act-listed species	Within seven days	• DCCEEW – 1800 803 772 • EPBC.Permits@environment.gov.au	Drilling Program Environment Advisor
Suspected or confirmed Invasive Marine Species introduction	Verbal notification ASAP	• Agriculture Victoria 136 186 marine.pests@agriculture.vic.gov.au • DRET Invasive Species Branch 03 6165 3777 invasivespecies@nre.tas.gov.au	Drilling Program Environment Advisor
Identification of any historic shipwrecks, aircraft, or relics	Written notification within 1 week	• Written notification via the notification of discovery of an historic shipwreck or relic online submission form. • Notification to the Victorian Department of Transport and Planning, Planning Implementation and Heritage Department via email. • Notification to the Tasmanian Parks and Wildlife Service, via email.	Drilling Manager
Identification of any First Nations cultural heritage relics or sites	Online notification within 24 hours after identification	• DCCEEW Australasian Underwater Cultural Heritage Database, online Notification of Discovery of Underwater Cultural Heritage online form.	Community Relations Manager
Identification of any unexploded ordnance	Written notification within 1 week	• Written notification via email to offshore.petroleum@defence.gov.au	Drilling Manager

8.3.2 EP Assurance

Table 8-4 provides a summary of the processes (specific measures) undertaken by Beach to ensure that for the duration of the Drilling Program:

- The environmental impacts and risks of the activity continue to be identified and reduced to a level that is ALARP.
- Control measures detailed in this EP are effective in reducing the environmental impacts and risks of the activity to ALARP and an acceptable level.
- Environmental performance outcomes and standards set out in this EP are being met.

Non-compliances and opportunities for improvements identified via the assurance processes in Table 8-4 and the following sections are communicated to the Drilling Manager to report and action in a timely manner.

Tracking of non-compliances and actions is undertaken using Beach's incident management system, which includes assigning a responsible person for ensuring the action is addressed and closed out. Any additional, or increased, impacts or risks identified are managed as per the Management of Change process detailed in Section 8.3.4.

Where an assurance process identifies a breach of an EPO or EPS in the EP this will be reported as a recordable incident as per Table 8-3.

Table 8-4: Drilling Program EP Assurance Processes

Process	Frequency	Responsible
EP Assurance Checks covering: • EPOs, EPS and implementation strategy requirements. See Section 8.3.2.	Prior to commencement of the Drilling Program	Drilling Program Environment Advisor
Incident reviews and investigations covering: • Review of all incidents to identify any recordable incidents and reportable incidents and any additional, or increased, environmental impacts or risks.	Weekly	Drilling Program Environment Advisor
• Reporting and investigation of incidents to identify recordable and reportable incidents and any additional, or increased, environmental impacts or risks. See Section 8.3.1.	As required	Drilling Manager with support from Drilling Program Environment Advisor
Activity impact and risk review to ensure impacts and risks can be manage to ALARP and an acceptable level and any additional, or increased, environmental impacts or risks identified.	As required	Drilling Manager
EP Performance Report covering: • Review of EPOs and EPs. See Section 8.3.7.	Annually	Drilling Program Environment Advisor
Activity emissions and discharge records See Section 8.3.8.	As detailed in Section 8.3.8.	Drilling Manager

8.3.3 Audits and Inspections

Environmental performance will be reviewed in several ways to ensure that for the duration of the EP:

- EPOs, EPSs and implementation strategy requirements are met.
- Controls measures are effective in reducing the environmental impacts and risks of the activity to ALARP and acceptable levels.
- Any additional, or increased, impacts or risks are identified.

A pre-mobilisation assurance check is undertaken prior to commencement of the Drilling Program. The assurance check consists of reviewing the EPs EPOs, EPSs, implementation strategy and Whale Management Procedure requirements.

In addition, the following will be undertaken:

- Rig and vessel weekly offshore inspection throughout the Drilling Program to ensure ongoing compliance with relevant EP requirements. Inspection will include, but not be limited to:
- Spill preparedness such as spill kit checks.

- Waste management.
- Review of any new or changed chemicals that maybe discharged offshore.
- Validation that compliance with EPOs and EPSs is maintained.

Non-compliances and opportunities for improvements identified via assurance checks or any other means are communicated to the Drilling Manager to report and action in a timely manner. Any additional, or increased, impacts or risks identified are managed as per the Management of Change process detailed in Section 8.3.4.

Tracking of non-compliances and actions is undertaken using Beach's incident management system which includes assigning a responsible person for ensuring the action is addressed and closed out.

Where an assurance check identifies a breach of an EPO or EPS in the EP this will be reported as a recordable incident as per Section 8.3.1.

The assurance checks inform the annual performance report submitted to the relevant regulator as per Section 8.3.7.

8.3.4 Management of Change Standard

Standard 7.3 defines the minimum planning and implementation requirements for technical and organisational change at Beach. It details the requirement for holistic assessment of the change, the requirement for consultation with stakeholder's dependent upon the nature of the change, and the need for clear accountability for the change. Risk associated with change is mitigated by ensuring change is appropriately approved, effectively implemented, formally assured, and closed out upon completion. Any changes must be classified as either temporary or permanent.

The intent of the Management of Change (MoC) Standard is that all temporary and permanent changes to the organisation, personnel, systems, procedures, equipment, products, and materials are identified and managed to ensure HSE risks arising from these changes remain at an acceptable level.

Changes to equipment, systems and documentation are managed in accordance with the MoC Standard to ensure that all proposed changes are adequately defined, implemented, reviewed, and documented by suitably competent persons. This process is managed using an electronic tracking database, which provides assurance that all engineering and regulatory requirements have both been considered and met before any change is operational. The MoC process includes not just plant and equipment changes, but also documented procedures where there is an HSE impact, regulatory documents and organisational changes that impact personnel in safety critical roles.

Not all changes require a technical MoC review. Each change is assessed on a case-by-case basis. The potential environmental impacts and/or risks are reviewed by a member of the Beach Environment Team to determine whether the MoC review process is triggered using the Environmental Management of Change Offshore Environment Plans Procedure (CDN/ID 18446109).

Where the MoC review processes identifies a change in impacts, risks, or controls compared to those described and assessed in Chapter 6, and triggers a regulatory requirement to revise this EP, the revision shall be defined, endorsed, completed and communicated in accordance with the MoC Standard.

8.3.5 Environment Plan Review

Beach may determine that a review of this EP is required when one or more of the following occurs:

- Changes to impacts and risks and/or controls identified during the Drilling Program.
- Annual environmental performance reporting identifies issues in the EP that require review and/or updating.
- Implementation of corrective actions to address internal audits findings or external inspection recommendations.
- Changes or new environmental requirements.
- An environmental incident and subsequent investigation identify issues in the EP that require review and/or updating.
- A modification of the activity is proposed that is not significant but needs to be documented in the EP.
- Changes in understanding of the existing environment such as:
    - EPBC Act listed threatened and migratory species.
    - Part 13 statutory instruments (recovery plans, threat abatement plans, conservation advice, wildlife conservation plans).
    - Marine protected areas and/or plans.
    - First Nations cultural heritage/values, Native Title, IPAs, ILUAs and management/Sea Country Plans.
    - Commercial fishing and marine users.
- Changes to impacts, risk and controls identified through the Risk Management Processes as per Section 2 and Section 7.1.
- New information or changes in information from relevant persons, research, studies, protected species, legal and other requirements. This shall be achieved by:
    - Subscription to regulator and relevant industry distribution lists (such as AEP and IOGP).
    - Subscription to the NOPSEMA website to identify any new petroleum activities within the Otway or Bass Basin that may overlap with the Drilling Program locations and timings.
    - Annual review of the EP inclusive of relevant regulatory requirements.
    - Consultation for Implementation of EP as per Section 4.16.

Any revisions to the EP are to be assessed against the criteria for submission of a revised EP to NOPSEMA as detailed in 8.3.6 and Management of Change as per Section 8.3.4 shall be evaluated.

8.3.6 Environment Plan Revision

In accordance with the OPGGS(E)R, if a revision of this EP is required it shall be submitted to NOPSEMA as per the regulatory requirements in Table 8-5.

Table 8-5: Regulatory requirements for submission of a revised EP

OPGGS(E)R	EP Revision Submission Requirements
38	With the regulator's approval before the commencement of a new activity.
39(1)	Before the commencement of any significant modification or new stage of the activity that is not provided for in the EP as currently in force.
39(2)	Before, or as soon as practicable after, the occurrence of any significant new or significant increase in environmental impact or risk; or The occurrence of a series of new or a series of increases in existing environmental impacts or risks which, taken together, amount to the occurrence of a significant new or significant increase in environmental impact or risk.
39(3)	A change in titleholder that results in a change in the manner in which the environmental impacts and risks of an activity are managed.

Revisions and re-submission of the EP generally centre around 'new' activities, impacts or risks and 'increased' or 'significant' impacts and risks. Beach defines these terms in the following manner:

New impact or risk – one that has not been assessed in Section 7.

Increased impact or risk – one with greater extent, severity, duration, or uncertainty than is detailed in Section 7.

Significant change –

- The change to the activity design deviates from the EP to the degree that it results in new activities that are not intrinsic to the existing Activity Description in Section 3.
- The change affects the ability to achieve ALARP or acceptability for the existing impacts and risks described in Section 7.
- The change affects the ability to achieve the EPO and EPS contained in Section 7.

A change in the activities, knowledge, or requirements applicable to the activity are considered to result in a 'significant new' or 'significant increased' impact or risk if any of the following criteria apply:

- The change results in the identification of a new impact or risk and the assessed level of risk is not 'Low', acceptable and ALARP.
- The change results in an increase to the assessed impact consequence or risk rating for an existing impact or risk described in Section 7.
- There is both scientific uncertainty and the potential for significant or irreversible environmental damage associated with the change.

While an EP revision is being assessed by NOPSEMA, any activities addressed under the existing accepted EP are authorised to continue. Additional guidance is provided in NOPSEMA Guideline When to submit a proposed revision of an EP (N-04750-GL1705).

Minor EP Revisions

Minor revisions to this EP that do not require resubmission to NOPSEMA will be made where:

- Minor administrative changes are identified that do not impact on the environment (e.g., document references, contact details, etc.).
- A review of the activity and the environmental risks and impacts of the activity do not trigger a requirement for a revision, as outlined in Table 8-5.
- Minor revisions to the EP will not be submitted to the regulators for formal assessment. Minor revisions will be tracked in the document control system.

8.3.7 Annual Performance Report

In accordance with OPGGS(E)R, Beach will submit a report on the environmental performance of the Drilling Program to NOPSEMA. Performance will be measured against the EPOs and EPSs described in this EP. The report will be submitted annually not more than three months after the anniversary date of the EP acceptance by NOPSEMA. The interval between reports after that will not be more than one year.

8.3.8 Emissions and Discharge Records

In accordance with OPGGS(E)R, emissions and discharges shall be recorded for the duration of the Drilling Program.

Table 8-6 details the types of emissions and discharges that shall be recorded including the monitoring method and frequency of reporting. Air emissions (from fuel combustion) are reported annually as part of statutory *National Greenhouse and Energy Reporting Act* (NGER) 2007 reporting and National Pollution Inventory (NPI) reporting.

Table 8-6: Emissions and Discharges Monitoring Requirements

Emission / Discharge	Monitoring parameter	Recording method	Reporting frequency	Responsibility
Fuel	Volume used	Daily report	Daily	Rig Contractor Vessel Contractor
Bilge	Volume discharged	Oil record Book	As required	
Sewage	Volume discharged	Garbage record book	As required	
Putrescible food	Volume discharged	Garbage record book	As required	
Waste	Volume sent to shore for disposal and recycling	Garbage record book	As required	
Drill fluids and cuttings	% ROC Volume discharged Volume sent to shore	Daily report	Daily	Service Provider

Emission / Discharge	Monitoring parameter	Recording method	Reporting frequency	Responsibility
Cement	Volume discharged Volume sent to shore	Daily report	Daily	Service Provider
Completion fluids	Volume discharged Volume sent to shore	Daily report	Daily	Service Provider
P&A well fluids	Volume discharged Volume sent to shore	Daily report	Daily	Service Provider
Flaring	Volume flared	Daily report	Daily	Service Provider

8.3.9 Marine Mammal Sighting Reports

Marine mammal sightings will be recorded and submitted to DCCEEW via the National Marine Mammal Data Portal. Sightings will be submitted annually not more than three months after the anniversary date of the EP acceptance by NOPSEMA. The interval between reports after that will not be more than one year.

8.4 Oil Pollution Emergency Response

Standard 8.3 defines the minimum performance requirements to effectively manage credible emergency and security events, and to enable an efficient recovery to normal operations following such an event. The Standard defines the prevention, preparedness, response, and recovery principles to be applied, the organisational structures to support emergency and security measures, and the training and testing protocols that must be in place to assure Beach maintains a state of readiness.

The emergency response framework to be applied to the Drilling Program is outlined in the following sections.

8.4.1.1 Emergency Response Framework

The Beach Crisis and Emergency Management Framework consists of a tiered structure whereby the severity of the emergency triggers the activation of emergency management levels. The emergency response framework contains three tiers based on the severity of the potential impact, as outlined in Figure 8-3. This framework is described in the Beach Emergency Management Plan (EMP) (CDN/ID 18025990).

The responsibilities of the Emergency Response Team (ERT), Emergency Management Team (EMT) and Crisis Management Team (CMT) are outlined in Table 8-7.

The key emergency response arrangements for the activity are outlined herein.

<u>Beach Emergency Management Plan</u>

The Beach EMP provides the standard mechanism for the EMT to operate from and includes guidance on effective decision-making for emergency events, identification, assessment, and escalation of events and provides training and exercise requirements. The EMP provides information on reporting relationships for command, control, and communications, together with interfaces to emergency services specialist response groups, statutory authorities, and other external bodies. The roles and

responsibilities are detailed for onshore and offshore personnel involved in an emergency, including the response teams, onshore support teams, visitors, contractors, and employees. The EMP details the emergency escalation protocol depending on the nature of the emergency.

Associated with the EMP are the Emergency Response Duty Roster and Contact Lists. These documents constitute a suite of emergency response documents that form the basis for Beach's response to an emergency situation.

Drilling Program Emergency Response Plan

For the Drilling Program Beach will prepare a bridging emergency response plan (Bridging ERP) that bridges to the emergency response measures in the vessel and rig contractor's vessel and rig-specific ERPs to ensure that all emergency management functions are accounted for. The Bridging ERP will be supported by the Beach EMP.

The Bridging ERP will describe the emergency roles and responsibilities for those on the rig and vessels, and outline the actions to be taken for potential Drilling Program specific scenarios (e.g., loss of containment, vessel collision, fire, person overboard, fatality, etc). The Bridging ERP will define the communication requirements to notify both Beach, contractor companies and external bodies of the incident so as to obtain assistance where needed and to fulfil reporting obligations.

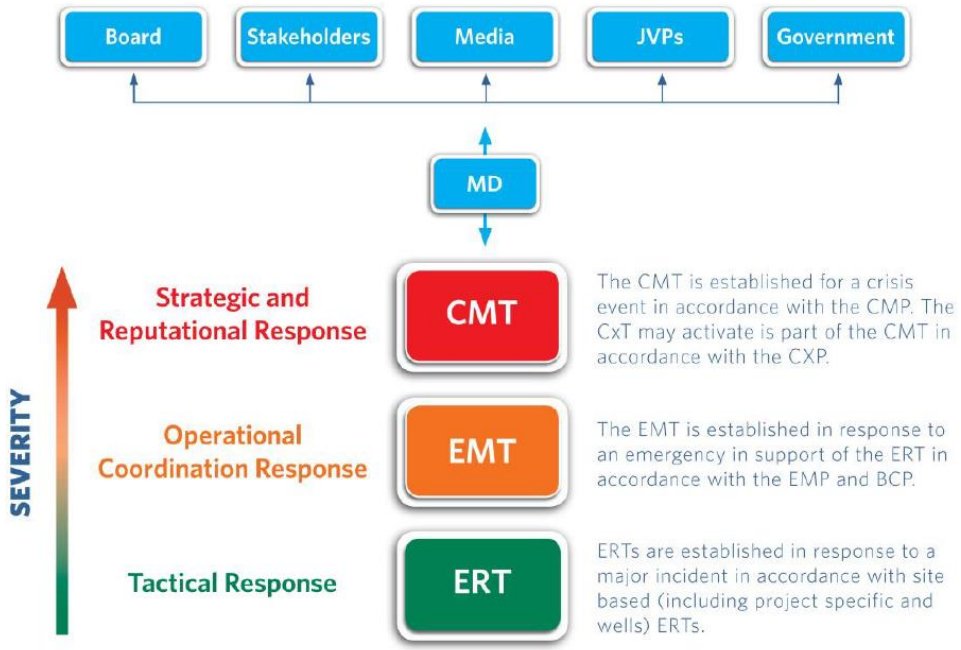

Figure 8-3: Beach Crisis and Emergency Management Framework

Table 8-7: Responsibilities of the Beach Crisis and Emergency Management Teams

Team	Base	Responsibilities
CMT	Adelaide head office	• Strategic management of Beach's response and recovery efforts in accordance with the Crisis Management Plan.

Team	Base	Responsibilities
		• Provide overall direction, strategic decision-making as well as providing corporate protection and support to activated response teams. • Activate the Crisis Management Team (CMT) if required.
EMT	Adelaide, Melbourne	• Provide operational management support to the Emergency Response team to contain and control the incident. • Implement the Business Continuity Plan. • Liaise with external stakeholders in accordance with the site-specific Emergency Response Plan. • Regulatory reporting.
ERT	Site Vessel	• Respond to the emergency in accordance with the site-specific ERP.

8.4.2 Oil Pollution Emergency Plan

Oil spill response arrangements associated with the Drilling Program are detailed in the Beach Offshore Oil Pollution Emergency Plan (OPEP) (CDN/ID 18986979/VIC 1000 SAF PLN).

Section 8.3.3 and the OPEP Section 10 On-Going Response Preparedness and Exercises detail the processes that Beach will undertake to ensure that oil spill response requirements can be met during the Drilling Program.

The rig and vessels used for the Drilling Program will have a Shipboard Marine Pollution Emergency Plan (SMPEP) or equivalent.

8.4.3 Operational and Scientific Monitoring Plan

Operational and scientific monitoring arrangement associated with Drilling Program are detailed within the Offshore Operational and Scientific Monitoring Plan (OSMP) (CDN/ID S4100AH717908) and OGV Drilling Program OSMP Addendum (V-1000-P1-RP-0003).

8.4.4 Testing of Spill Response Arrangements

The OPEP details the oil spill response testing arrangements.

8.5 Environment and Community

Element 10 focuses on the measures the organisation must take to ensure that it upholds its reputation as a responsible and ethical company and continues its open and transparent engagements with its communities and stakeholders which includes relevant persons. Beach operates in environmentally sensitive areas, in close proximity to communities, with potential impacts on stakeholders. Beach has an obligation to ensure that potential impacts from its activities are clearly identified, minimised to ALARP, and mitigated where there is an economic loss to a stakeholder directly impacted by Beach activities.

8.5.1 Environment Management Standard

Standard 10.1 ensures that Beach implements appropriate plans and procedures to conduct its operations in an environmentally responsible and sustainable manner. The standard defines the requirement to assess environmental impacts and risks that may result from the company's operations and for site-specific management plans to protect the environment from harm. The standard covers

land disturbance, reinstatement, and rehabilitation activities, and defines obligations for management of biodiversity, water systems, air quality, noise and vibration, amenities and waste.

This EP provides the key means of satisfying this OEMS standard. Two process identified as controls in Section 7, the Beach Domestic IMS Biofouling Risk Assessment Process and the Beach Chemical Management Procedure are described below.

8.5.2 Beach Domestic IMS Biofouling Risk Assessment Process

Scope

The rig, vessels and submersible equipment mobilised from domestic waters to undertake the Drilling Program within the Operational Area must complete the Beach Domestic IMS Biofouling Risk Assessment Process as detailed in the Beach's Introduced Marine Species Management Plan (CDN/ID 18985823) prior to the initial mobilisation into the operational area.

This domestic IMS biofouling risk assessment process does not include an evaluation of potential risks associated with ballast water exchange given the rig and vessel operators contracted to Beach must comply with the most recent version of the Australian Ballast Water Management Requirements.

Purpose

- Validate compliance with regulatory requirements (Commonwealth and State) in relation to biosecurity prior to commencing the Drilling Program within the Operational Area.
- Identify the potential IMS risk profile of the rig, vessels, and submersible equipment prior to deployment within the Operational Area.
- Identify potential deficiencies of IMS controls prior to entering the Operational Area.
- Identify additional controls to manage IMS risk.
- Prevent the translocation and potential establishment of IMS into non-affected environments (either to or from the Operational Area).

Screening Assessment

Prior to the initial mobilisation of the rig, vessels or submersible equipment to the Operational Area, a screening assessment must be undertaken considering:

- All relevant IMO and regulatory requirements under the *Biosecurity Act 2015* and/or relevant Australian State or Territory legislation must be met.
- If mobilising from a high or uncertain risk area, the rig / vessel / submersible equipment must have been within that area for fewer than 7 consecutive days or inspected and deemed low-risk by an independent IMS expert, within 7 days of departure from the area.
- Vessels must have valid antifouling coatings based upon manufacturers specifications.
- Vessels must have a biofouling control treatment system in use for key internal seawater systems.

- Rig and vessels must have a Biofouling Management Plan and record book consistent with the International Maritime Organization (IMO) 2011 Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species (IMO Biofouling Guidelines).

Where relevant criteria have been met, no further management measures are required, and the rig / vessel / submersible equipment may be deployed into the Operational Area.

Where relevant criteria have not been met, or there is uncertainty if these criteria have been met, Beach must engage an independent IMS expert to undertake a detailed biosecurity risk assessment, and the rig / vessel / submersible equipment must be deemed low-risk prior to mobilisation into the Operational Area.

Basis of Detailed IMS Biofouling Risk Assessment

The basis by which an independent IMS expert evaluates the risk profile of the rig / vessel / submersible equipment includes:

- The age, type and condition of the rig / vessel / submersible equipment.
- Previous cleaning and inspection undertaken and the outcomes of previous inspections.
- Assessment of internal niches with potential to harbour IMS.
- The rig / vessel / equipment history since previous inspection.
- The origin of the rig / vessel / submersible equipment including potential for exposure to IMS.
- Translocation risk based upon source location in relation to activity location – both in relation to the water depth / proximity to land at the point of origin and the potential survivorship of IMS from the point of origin to the Operational Area.
- The mobilisation method – whether dry or in-water (including duration of low-speed transit through high or uncertain risk areas).
- For vessels, the application, age and condition of antifouling coatings.
- Presence and condition of internal seawater treatment systems.
- Assessment of Biofouling Management Plan and record book against IMO Biofouling Guidelines.
- Where appropriate, undertake in-water inspections.

8.5.3 Chemical Management Procedure

The Hazardous Materials and Secondary Containment Directive addresses the management of hazardous substances and dangerous goods (termed “hazardous materials”) on Beach controlled sites/facilities.

The Beach Hazardous Chemicals Management Procedure and Hazardous Materials Risk Assessment (CDN/ID 8743319) are used to assess all chemicals used at Beach to minimise the potential incidents arising from the storage and handling of hazardous chemicals. This includes chemicals used during the

Drilling Program that could be discharged to the marine environment to ensure that the impacts and risks associated with offshore discharges are reduced to ALARP and an acceptable level. It considers aquatic toxicity, bioaccumulation, and persistence data, along with the discharge concentration, duration, frequency, rate, and volume to assess chemicals that may or will be discharged to the marine environment. The assessment and outcome is recorded on the Offshore Chemical Register.

Figure 8-4 provides a summary of the offshore chemical environmental risk assessment process.

Do I need to complete a Environmental Offshore Risk Assessment - Victoria ?

Question	Comments
1. Is any of the chemical discharged offshore through its mode of use?	**Does not apply to:** Products used solely within the accommodation module. Additives to potable water systems, paints and other coatings, fuels, lubricants, fire-fighting foams, hydraulic fluids used in cranes and other machinery **Does apply to:** Rig washes, pipe dopes, jacking greases and hydraulic fluids used to control wellheads and blow-out preventers. As well as those chemicals used in the actual production of hydrocarbons.
2. If yes above, is the CHARM or OCNS ranking as specified in the offshore Environment Plan?	**BassGas** IMP5.6 Workover fluids - CHARM Gold or OCNS E RSK4.2 Deck drainage - OCNS D or E **Otway** IMP-04 Geographe hydraulic fluid - OCNS D RSK-03 MEG - OCNS D RSK-03 MEG additives - CHARM Silver, OCNS D or better. RSK-04 Methanol - OCNS E Refer to the EP and Environmental Advisor for further details. Use the link below to find a product's CHARM or OCNS ranking: https://www.cefas.co.uk/cefas-data-hub/offshore-chemical-notification-scheme/hazard-assessment/
3. Is there H&S and/or technical justification for using the product?	If NO - then an alternative product must be selected. If YES - then conduct a risk assessment using the corporate template in Tab 7. Take into consideration HSE and technical requirements to demonstrate that the risks are reduced to ALARP. Important data for the environmental component includes: MSDS Section 12 information - aquatic toxicity, bioaccumulation and persistence data (refer to the table below for guidance). Discharge concentration, duration, frequency, rate, and volume. If MSDS data is not available then contact the chemical supplier or consult a chemical database such as the U.S Environmental Protection Agency ECOTOX database, using the link below. https://cfpub.epa.gov/ecotox/

	Lowest hazard				Highest hazard
Aquatic toxicity (ppm)	>1,000	>100-1,000	>10-100	>1-10	<1
Sediment toxicity (ppm)	>10,000	>1,000-10,000	>100-1,000	>10-100	<10
Bioaccumulation and Persistence	Readily biodegradable and non-bioaccumulative	Inherently biodegradable and non-bioaccumulative	Not biodegradable and non-bioaccumulative or Readily biodegradable and bioaccumulates	Inherently biodegradable and bioaccumulates	Does not biodegrade and bioaccumulates

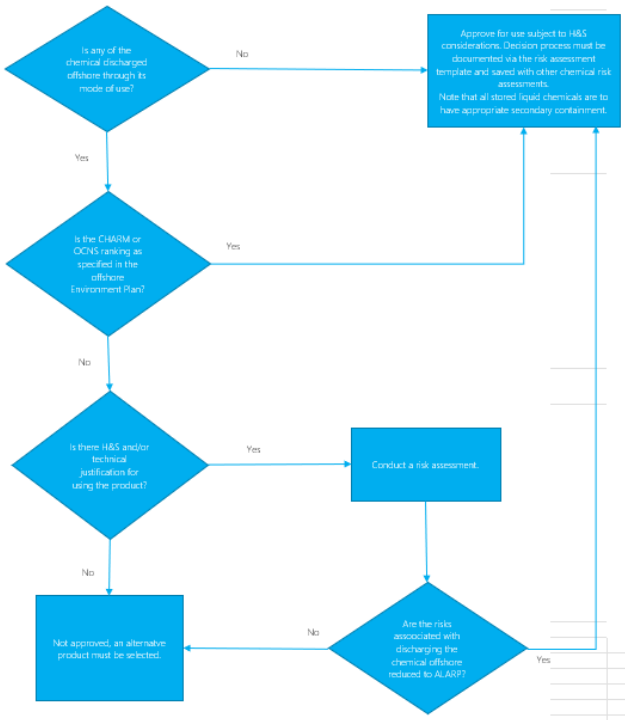

Figure 8-4: Hazardous Materials Risk Assessment, Section 6a Environmental Criteria - Vic

8.5.4 Community Engagement

Standard 10.2 defines the minimum requirements for the conduct of Beach and its staff within the community, and the commitments to plan and execute effective community engagement in the course of its business. Beach staff will conduct themselves as ambassadors for the company and engage positively and respectfully with the community.

The standard describes the obligation of the company to proactively engage with the community at the outset of any activity that may have an impact on that community, and to develop a stakeholder engagement plan to manage that engagement.

Stakeholder consultation specific to the Drilling Program is detailed in Section 4.

8.6 Records Management

Element 3 Information Management and Legal describes the measures Beach must take to ensure ongoing compliance with regulatory and legal obligations in order to protect the Company's value and reputation, and to maintain Beach's licences to operate. Beach's ability to safely perform its duties in line with its legal obligations relies on robust management of documents and information.

8.6.1 Regulatory Compliance

Standard 3.1 Regulatory Compliance describes the responsibilities of each stakeholder and the processes for identifying, maintaining, managing and reporting Beach's regulatory compliance obligations. The Standard details the minimum requirements of a system to ensure effective Regulator engagement can be maintained across all its activities including permissions, project execution, operating and reporting.

Section 4.5 of this EP details the key environmental requirements applicable to the Drilling Program. The acceptability discussion for each aspect is assessed in Section 7 and specifically details the environmental requirements pertaining to each aspect.

8.6.2 Document Management

Standard 3.2 Document Management specifies the minimum requirements to ensure that all Beach documents and records are managed in alignment with legal, regulatory and stakeholder requirements. It requires documents to be classified, developed, authorised, published, stored, accessed, reviewed and disposed consistently and in a manner that complies with company and statutory obligations. The document management system will clearly support the safe and efficient operations of the Company.

Documents and records relevant to the implementation of this EP are stored and maintained in the Beach document control system ('TeamBinder') for a minimum of five years. These records will be made available to regulators in electronic or printed form upon request.

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Appendix A Report on Consultation

Engagement Summary
"OGV Drilling P and A"

25(1)(a) Department or agency of the Commonwealth

Commonwealth Government Entity ID: 989 - Australian Fisheries Management Authority

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36221	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34951	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33305	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34010	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38900	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38901	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commonwealth Government Entity ID: 1477 - Australian Maritime Safety Authority - Joint Rescue Coordination Centre

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36223	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34953	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33307	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34012	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38906	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commonwealth Government Entity ID: 1519 - Department of Agriculture, Fisheries and Forestry - Biosecurity and Marine Pests

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36313	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35072	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33422	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34129	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34130	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38909	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commonwealth Government Entity ID: 239075405 - Department of Climate Change, Energy, the Environment and Water - Oceans

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36314	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35073	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33423	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34131	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38910	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commonwealth Government Entity ID: 1520 - Department of Defence - Australian Hydrographic Office

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36319	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E39659	5/07/2023	Email	Incoming		Project update - locations	Raised objection or claim The activity areas are located within restricted airspace Beach Energy is advised that unexploded ordnance (UXO) may be present on and in the sea floor. Beach Energy must, therefore, inform itself as to the risks associated with conducting activities in the area (for example, the detonation of UXO).	Objection or claim has merit Claim has merit	Beach Energy has mapped our activity operational areas with the available UXO information from the Department of Defence database. This has identified that the Operational Areas in the Otway Basin overlap UXO Zone 1052 King Island which is within the 'slight potential' category' and UXO Zone SDG087 'Sea Dumping – King Island'. Prior to any seabed disturbance activities we will undertake a geophysical survey to identify any potential UXO	Additional measures or controls added to EP to address potential impacts CM06: Drill Rig Mooring Plan The following will be considered in the final selection of well locations and drill rig position and location of mooring equipment:
E35081	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39660	17/07/2023	Email	Outgoing		Project update - locations	Beach Energy has mapped our activity operational areas with the available UXO information from the Department of Defence database. This has identified that the Operational Areas in the Otway Basin overlap UXO Zone 1052 King Island which is within the 'slight potential' category' and UXO Zone SDG087 'Sea Dumping – King Island'.			
E35544	16/08/2023	Email	Incoming		Project update - locations	Acknowledgement of Beach email Acknowledgement of beach email.	N/A no objections or claims made	N/A no objections or claims made	
E33428	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34136	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38915	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received Consultation in the course of preparation of the EP has been completed in accordance with the OPPGS (E) Regulations. Beach engages in ongoing consultation during the implementation of this EP and Relevant Persons can provide feedback to Beach on any new relevant matters that may emerge. Beach will assess any new matters and where appropriate, Beach will apply its Management of Change Standard (section 8. 3.4.).	N/A no response received	N/A no response received	

Commonwealth Government Entity ID: 1521 - Department of Defence - Infrastructure Division, Defence Support & Reform Group

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36320	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35082	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33429	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34137	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38916	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commonwealth Government Entity ID: 4905 - Department of Industry, Science and Resources

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36331	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35095	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33440	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34148	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38917	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commonwealth Government Entity ID: 4898 - Director of National Parks

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36351	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35076	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34181	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E36744	27/11/2023	Email	Outgoing		Project update - general	Acknowledgement of Beach email Beach sent the consultation information for DNP for the drilling and P&A EP in accordance with the NOPSEMA and Parks Australia Petroleum Activities and Australian Marine Parks: A guidance note to support environmental protection and effective consultation N-04750 -GN1785 A620236 (01/06/2023) Beach also included shape files for Project/Activity Areas and Planning Area/EMBAs.	N/A no objections or claims made	N/A no objections or claims made	
E36752	28/11/2023	Email	Incoming		Project update - locations	Acknowledgement of Beach email	N/A no objections or claims made	N/A no objections or claims made	
E37899	7/12/2023	Email	Incoming		Project update - locations	Raised objection or claim Note that the planned activities do not overlap any Australian Marine Parks, therefore there are no authorisation requirements from the DNP. note that modelling demonstrates that activities undertaken may affect the values present in Zeehan Marine Park, Boags Marine Park, and Apollo Marine Park. Zeehan Marine Park Apollo Marine Park	Objection or claim has merit Beach acknowledges some DNP and objections and claims have merit in regards to emergency response reporting activity commencement and cessation notices, and BIAs and KEFs. The following does not have merit: Response details that the Director of National Parks considers operational areas	Drilling and P&A EP has been updated to include the following: • Emergency responses reporting requirements. • Activity commencement and cessation notifications. We will update the Environment Plan to reflect that the BIAs and KEF you detail	Additional measures or controls added to EP to address potential impacts Drilling and P&A EP has been updated to include the following: • Emergency responses reporting requirements. • Activity commencement and cessation notifications. Environment Plan updated to reflect that the

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						Boags Marine Park Bullers Albatross Bullers Albatross Black browed Albatross Campbell Albatross Campbell Albatross Bullers Albatross Indian yellow nosed Albatross Indian Yellow nosed Albatross Campbell Albatross Antipodean Albatross Wandering Albatross Indian Yellow nosed Albatross Wedge tailed Shearwater Antipodean Albatross Wandering Albatross White faced storm petrel Wedge tailed Shearwater White faced Storm petrel Common diving petrel White faced Storm petrel Pygmy Blue Whale Short tailed shearwater Common Diving petrel Southern Right Whale White Shark White Shark Pygmy Blue Whale Pygmy Blue Whale Southern Right Whale Southern Right Whale We also note that the operational area may intersect with the following Key Ecological Feature: • West Tasmania Canyons These BIAs and KEF are identified values of the Zeehan, Apollo and Boags marine parks and it is expected that activities that could affect these BIAs are managed accordingly. In the context of the management plan objectives and values, you should ensure that the EP: - identifies and manages all impacts and risks on all Australian marine park values (including ecosystem values) to an acceptable level and has considered all options to avoid or reduce them to as low as reasonably practicable. - clearly demonstrates that the activity will not be inconsistent with the relevant legislation listed in the class approval. The three Marine Parks previously mentioned that may be impacted form part of the South-east Marine Parks Network and further information on the transitional arrangements for the South-east Marine Parks can be found on our website. Information on the values for the marine parks is also located on the Australian Marine Parks Science Atlas. The Director of National Parks considers operational areas to encompass the active source and acquisition areas and includes operational activities such as line turns / repositioning, equipment maintenance, deployment and recovery, crew change and resupply. These are offshore petroleum activities and should identified in the EP to ensure risks to AMPs are assessed and effective mitigation applied confirm that we do not require further notification of progress made in relation to this activity unless details regarding the activity change and result in an overlap with a marine park or new impact	to encompass the active source and acquisition areas and includes operational activities such as line turns / repositioning, equipment maintenance, deployment and recovery, crew change and resupply. Beach confirms that there will be no seismic activity, active source as part of the Drilling Program. Crew change and resupply of the drill rig will occur within the Operational Area.	below are values of the AMPs and will ensure that the EP: • identifies and manages all impacts and risks on all Australian marine park values (including ecosystem values) to an acceptable level and has considered all options to avoid or reduce them to as low as reasonably practicable. • clearly demonstrates that the activity will not be inconsistent with the relevant legislation listed in the class approval. The following does not have merit: email details that the Director of National Parks considers operational areas to encompass the active source and acquisition areas and includes operational activities such as line turns / repositioning, equipment maintenance, deployment and recovery, crew change and resupply. Beach confirms that there will be no seismic activity, active source as part of the Drilling Program. Crew change and resupply of the drill rig will occur within the Operational Area. Environment Plan updated to reflect that the BIAs and KEF identified are values of the AMPs.	BIAs and KEF identified are values of the AMPs.

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						The DNP should be made aware of oil/gas pollution incidences which occur within a marine park or are likely to impact on a marine park as soon as possible. Notification should be provided to the 24-hour Marine Compliance Duty Officer on 0419 293 465.			
E38052	8/12/2023	Email	Outgoing		Project update - locations	Requested consultation Beach has been using the South-east Commonwealth Marine Reserves Network Management Plan 2013 -2023 to identify values of the AMPs. We have looked at the Australian Marine Parks Science Atlas that you mention below, but are unable to see where it identifies BIAs and KEFs as values. Could you provide more detail for future reference. DNP responded - In regards to the Marine Park Science Atlas and where it identifies Biologically Important Areas (BIA's) and Key Ecological Features (KEF's), from the home page if you look across the top at the tabs you will see Marine Parks, from there you can select individual marine parks which will then provide you with a some general information about the park , a list of current research pertaining to the park and further down you will find Biologically Important Areas and Key Ecological Features for that particular park listed under Natural Values.	Relevant matter Thank you for information as to where to find the BIAs and KEFs. We have updated the Beach Energy Offshore Gas Victoria – Drilling and P&A EP with this information.	N/A no objections or claims made Thank you for information as to where to find the BIAs and KEFs. We have updated the Beach Energy Offshore Gas Victoria – Drilling and P&A EP with this information.	No additional measures or controls are required
E38054	11/12/2023	Email	Incoming		Project update - locations	Acknowledgement of Beach email In regards to the Marine Park Science Atlas and where it identifies Biologically Important Areas (BIA's) and Key Ecological Features (KEF's), from the home page if you look across the top at the tabs you will see Marine Parks, from there you can select individual marine parks which will then provide you with a some general information about the park , a list of current research pertaining to the park and further down you will find Biologically Important Areas and Key Ecological Features for that particular park listed under Natural Values.	N/A no objections or claims made	N/A no objections or claims made	
E38340	19/12/2023	Email	Outgoing	Link to website	Project update - locations	Requested consultation Thank you for the information as to where to find the BIAs and KEFs in the Marine Park Science Atlas	Relevant matter We were unable to locate BIAs and KEFs on the Marine Park Science Atlas.	N/A no objections or claims made Thank you for the information as to where to find the BIAs and KEFs in the Marine Park Science Atlas	Additional measures or controls added to EP to address potential impacts Beach has updated the Offshore Gas Victoria – Drilling and P&A EP with the BIA and KEF information
E38920	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received Consultation in the course of preparation of the EP has been completed in accordance with the OPPGS (E) Regulations. Beach engages in ongoing consultation during the implementation of this EP and Relevant Persons can provide feedback to Beach on any new relevant matters that may emerge. Beach will assess any new matters and where appropriate, Beach will apply its Management of Change Standard (section 8. 3.4.	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35281	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35282	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35283	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34337	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34338	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34339	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38923	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38924	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38925	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Indigenous Entity ID: 239075406 - Indigenous Land and Sea Corporation

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35206	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35207	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34627	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34700	21/11/2023	Email	Incoming	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34701	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

25(1)(b) Department or agency of a state

Local Authorities Entity ID: 71303169 - Corangamite Catchment Management Authority

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36284	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35038	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35039	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35040	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35041	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33391	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34096	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34097	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34098	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34099	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39050	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39051	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39052	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39053	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 239075362 - Department of Energy, Environment and Climate Action - Marine & Coasts

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36323	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35093	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35094	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33430	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33431	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34139	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39186	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 1527 - Department of Energy, Environment and Climate Action: Earth Resources Regulation

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36330	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35091	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33439	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34147	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39192	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 264241159 - Department of Infrastructure and Transport - Marine Safety SA

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36332	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35096	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33441	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34149	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39193	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 239075420 - Department of Natural Resources and Environment Tasmania - Biosecurity

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36333	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35097	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33442	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34150	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39194	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 4194633 - Department of Natural Resources and Environment Tasmania - Conservation

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36334	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35098	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33443	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34151	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39195	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 1529 - Department of Natural Resources and Environment Tasmania - Marine/Fishing (Fishing Tasmania)

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36335	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35105	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33450	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34158	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39202	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 268435457 - Department of Natural Resources and Environment Tasmania - Strategic Projects and Policy

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36341	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35106	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33451	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34159	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39203	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 239075432 - Department of Natural Resources and Environment Tasmania - Tasmania Parks and Wildlife Services

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36342	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35108	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33453	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34160	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34161	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39204	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39205	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 243269638 - Department of Premier and Cabinet - Office of Aboriginal Affairs - (Tasmania)

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36343	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35110	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33455	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34162	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34163	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39207	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 239075500 - Department of Primary Industries and Regions South Australia - Commercial Fishing

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36345	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35111	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33465	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34164	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39215	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 25165847 - Department of Primary Industries NSW - Commercial Fishing NSW Advisory Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33949	17/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33969	20/11/2023	Email	Outgoing	Link to website	Project introduction	Acknowledgement of Beach email Email reaching out as a new RP, noting the activity is a long distance from their location.	N/A no objections or claims made	N/A no objections or claims made	
E34597	21/11/2023	Email	Incoming	Link to website	Project update - general	Advised don't want further consultation Confirmed they would only comment if NSW fishers were to be impacted. They stated this was very unlikely.	N/A no objections or claims made	N/A no objections or claims made	
E34174	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39216	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 25165845 - Department of Primary Industries NSW - Marine Parks

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33466	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33964	20/11/2023	Email	Outgoing	Link to website	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34175	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39217	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 999 - Department of Transport and Planning: Marine Pollution

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36349	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35115	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33469	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34178	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39220	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 239075480 - Environment Protection Authority (EPA) - South Australia

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36362	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35131	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33485	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34195	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39223	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 1001 - Environment Protection Authority (EPA) Tasmania

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36364	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35133	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33486	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34198	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34890	23/11/2023	Email	Incoming		Project update - locations	Requested consultation Request for webinar registration details.	N/A no objections or claims made	N/A no objections or claims made	
E34891	23/11/2023	Email	Outgoing		Project update - locations	N/A no response received Webinar details shared.	N/A no objections or claims made	N/A no objections or claims made	
E39224	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 1537 - Environment Protection Authority (EPA) Victoria

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36365	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35135	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35545	16/08/2023	Email	Incoming		Project update - general	Acknowledgement of Beach email Confirmed info received and shared with relevant teams internally.	N/A no objections or claims made	N/A no objections or claims made	
E33488	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34199	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39226	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
State Government Entity ID: 1458 - First Peoples - State Relations (Victoria)									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36372	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35151	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E37275	31/07/2023	Meeting - online			Project update - general	Requested consultation Online meeting - First People State Relations highlighted that proponents should be mindful that traditional owners do not always recognise state boundaries. First People State Relations recommends inductions for staff on cultural heritage informing what to look out for and developing an understanding of First Nations connection to sea country. First People State Relations requested Beach consider publishing reports as and when cultural heritage data is available.	Objection or claim has merit Beach does not consider state boundaries when assessing the marine environment. The environment is transboundary, so we assess the existing environment (including socio-economic) in a spatial extent rather than referring to specific state boundaries. Agree induction would be beneficial.	N/A no response received Beach has a dedicated First Nations Engagement Manager who can develop induction material and agrees it would be beneficial. Beach will consider publishing this data in consultation with First Nations groups. Our underwater archaeological assessment will include an assessment of submerged landscapes.	Additional measures or controls added to EP to address potential impacts Inductions will include commentary on sea country for all crew working in this offshore area.
E37335	6/12/2023	Email	Outgoing	Link to website	Project update - general	Raised objection or claim Confirmation that Beach that has a contract signed with Wessex and Extent to now to support us in this work. • Be mindful that traditional owners don't always recognise state boundaries • UNESCO protection of underwater cultural heritage act likely to be ratified "soon" • Important that Beach methodology and procedure is informed/endorsed by an archaeologist. Archaeologist should have some experience with aboriginal submerged landscape • Inductions to staff for what to look out for and understand connection to sea country • Would like Beach/archaeologists to publish ongoing reports as and when data is available Consultation in the course of preparation of the EP has been completed in accordance with the OPPGS (E) Regulations. Beach engages in ongoing consultation during the implementation of this EP and Relevant Persons can provide feedback to Beach on any new relevant matters that may emerge. Beach will assess any new matters and where appropriate, Beach will apply its Management of Change Standard (section 8. 3.4.).	Objection or claim has merit Some objections or claims have merit and the advice to engage experts in sea country and cultural heritage is appreciated. Beach has commissioned WESSEX/Extent Archaeology to carry out a survey as a due diligence activity.	•Beach has commissioned WESSEX/Extent Archaeology to carry out a survey as a due diligence activity. Be mindful that traditional owners don't always recognise state boundaries – Beach does not consider state boundaries when assessing the marine environment. The environment is transboundary, so we assess the existing environment (including socio-economic) in a spatial extent rather than referring to specific state boundaries. Our underwater archaeological assessment will include an assessment of submerged landscapes. • UNESCO protection of underwater cultural heritage act likely to be ratified "soon" - Beach is required to recognise possible future regulations in the EP. We would, therefore, include reference to this Act regardless of whether it has been officially ratified by the Australian Govt. • Important that Beach methodology and procedure is informed/endorsed by an archaeologist. Archaeologist should have some experience with aboriginal submerged landscape - Beach are engaging Wessex / Extent to undertake this work. Wessex has many years of experience in this area. They will work in partnership with locally experienced archaeologists (Extent). Any find would be formally identified with the location placed on the national record. • Inductions to staff for what to look out for and understand connection to sea country - Inductions will include commentary on sea country for all crew working in this offshore area.	Additional measures or controls added to EP to address potential impacts Inductions will include commentary on sea country for all crew working in this offshore area.

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
								• Would like Beach/archaeologists to publish ongoing reports as and when data is available - Beach will consider publishing this data in consultation with First Nations groups	
State Government Entity ID: 1561 - Heritage Victoria									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36405	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35205	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E37277	31/07/2023	Meeting - online			Project update - general	Requested consultation In person meeting with Heritage Victoria and First Peoples State Relations. • Be mindful that traditional owners don't always recognise state boundaries • UNESCO protection of underwater cultural heritage act likely to be ratified "soon" • Important that Beach methodology and procedure is informed/endorsed by an archaeologist. Archaeologist should have some experience with aboriginal submerged landscape • Inductions to staff for what to look out for and understand connection to sea country - • Would like Beach/archaeologists to publish ongoing reports as and when data is available -	Objection or claim has merit Beach does not consider state boundaries when assessing the marine environment. The environment is transboundary, so we assess the existing environment (including socio-economic) in a spatial extent rather than referring to specific state boundaries. Beach is required to recognise possible future regulations in the EP. We would, therefore, include reference to this Act regardless of whether it has been officially ratified by the Australian Govt.	Beach appreciated the advice around qualified experts for cultural heritage and sea country. Beach is engaging Wessex / Extent to undertake this work. Wessex has many years of experience in this area. They will work in partnership with locally experienced archaeologists (Extent). Any find would be formally identified with the location placed on the national record. Beach will consider publishing this data in consultation with First Nations groups.	Additional measures or controls added to EP to address potential impacts Our underwater archaeological assessment will include an assessment of submerged landscapes. Inductions will include commentary on sea country for all crew working in this offshore area.
E34256	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34257	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E37334	6/12/2023	Email	Outgoing	Link to website	Project update - locations	Raised objection or claim • Be mindful that traditional owners don't always recognise state boundaries • UNESCO protection of underwater cultural heritage act likely to be ratified "soon" • Important that Beach methodology and procedure is informed/endorsed by an archaeologist. Archaeologist should have some experience with aboriginal submerged landscape • Inductions to staff for what to look out for and understand connection to sea country - • Would like Beach/archaeologists to publish ongoing reports as and when data is available - Consultation in the course of preparation of the EP has been completed in accordance with the OPPGS (E) Regulations. Beach engages in ongoing consultation during the implementation of this EP and Relevant Persons can provide feedback to Beach on any new relevant matters that may emerge. Beach will assess any new matters and where appropriate, Beach will apply its Management of Change Standard (section 8. 3.4.	Objection or claim has merit Beach does not consider state boundaries when assessing the marine environment. The environment is transboundary, so we assess the existing environment (including socio-economic) in a spatial extent rather than referring to specific state boundaries Beach is required to recognise possible future regulations in the EP. We would, therefore, include reference to this Act regardless of whether it has been officially ratified by the Australian Govt. Beach has commissioned WESSEX/Extent Archaeology to carry out a survey as a due diligence activity. Beach are engaging Wessex / Extent to undertake this work. Wessex has many years of experience in this area. They will work in partnership with locally experienced archaeologists (Extent).	• Be mindful that traditional owners don't always recognise state boundaries – Beach does not consider state boundaries when assessing the marine environment. The environment is transboundary, so we assess the existing environment (including socio-economic) in a spatial extent rather than referring to specific state boundaries. Our underwater archaeological assessment will include an assessment of submerged landscapes. • UNESCO protection of underwater cultural heritage act likely to be ratified "soon" - Beach is required to recognise possible future regulations in the EP. We would, therefore, include reference to this Act regardless of whether it has been officially ratified by the Australian Govt. • Important that Beach methodology and procedure is informed/endorsed by an archaeologist. Archaeologist should have some experience with aboriginal submerged landscape - Beach are engaging Wessex / Extent to undertake this work. Wessex has many years of experience in this area. They will work in partnership with locally experienced archaeologists (Extent). Any find would be formally identified with the	Additional measures or controls added to EP to address potential impacts Inductions will include commentary on sea country for all crew working in this offshore area.

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
								location placed on the national record. • Inductions to staff for what to look out for and understand connection to sea country - Inductions will include commentary on sea country for all crew working in this offshore area. • Would like Beach/archaeologists to publish ongoing reports as and when data is available - Beach will consider publishing this data in consultation with First Nations groups.	

State Government Entity ID: 8388636 - Marine and Safety Tasmania

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36447	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35258	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33596	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34309	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39232	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 25165851 - NSW National Parks and Wildlife Service

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E38323	15/12/2023	Email	Outgoing	Link to website	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E39234	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 4194369 - Office of the Minister for Resources

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36478	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35298	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 1634 - Parks Victoria

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36482	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35320	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33667	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34371	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39251	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 25165835 - Transport for NSW

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33820	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33967	20/11/2023	Email	Outgoing	Link to website	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34615	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34537	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39256	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 1711 - Transport Safety Victoria - Maritime Safety Victoria

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36608	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36609	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36610	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35474	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35475	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35476	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33821	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33822	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33823	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34538	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34539	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34540	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39257	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39258	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39259	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 1025 - Victorian Fisheries Authority

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36615	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36616	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36617	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36618	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36619	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36620	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35395	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35483	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35484	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35485	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35486	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35487	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35488	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35489	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E36198	14/09/2023	Email	Outgoing	Info sheet update	Project update - general	Requested consultation Beach Fair Ocean Access policy and compensation procedure shared. Action from peak bodies meeting.	N/A no objections or claims made	N/A no response received	
E33747	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33830	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33831	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33832	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33833	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33834	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33835	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33836	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34461	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34547	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34548	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34549	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34550	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34551	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34552	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34553	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38716	5/01/2024	Email	Outgoing	Info sheet	Project update - general	N/A no response received Follow up email to VFA with the finalised fishing effort report	N/A no response received	N/A no response received	
E39548	23/01/2024	Email	Outgoing		Project update - general	N/A no response received Beach notified relevant control measures.	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

25(1)(c) Department of the responsible State Minister

State Government Entity ID: 8388638 - Department of State Growth - Mineral Resources Tasmania

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36347	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35113	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33468	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34176	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39219	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 4194372 - Office of the Minister Energy and Resources

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36477	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35297	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33639	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34353	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39240	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

25(1)(d) A person whose functions, interests or activities may be affected by the activities to be carried out under the EP

Business Entity ID: 4194721 - Apollo Bay Chamber of Commerce

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36202	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34927	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33282	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33987	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38724	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 4194546 - Aventus Consulting

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36234	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34965	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33319	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34024	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38727	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 239075429 - Coastal Planning

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36261	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35016	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33364	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34072	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E36745	27/11/2023	Email	Incoming		Project update - locations	Acknowledgement of Beach email Requested webinar details	N/A no objections or claims made	N/A no objections or claims made	
E36746	27/11/2023	Email	Outgoing		Project update - locations	Requested consultation Webinar details provided	N/A no objections or claims made	N/A no objections or claims made	
E38728	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 1540 - Esso

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36369	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35138	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33491	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34203	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38745	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 4720 - King Island Chamber of Commerce

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36419	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36420	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35222	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35223	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33562	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33563	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34275	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34276	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38750	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38751	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 268435518 - Ocean Impact Organisation

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36467	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35286	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33628	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34342	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38760	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 268435531 - One Gippsland

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35299	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33640	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34354	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34696	22/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E38761	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 25165825 - Savour King Island

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33729	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E39559	17/11/2023	Info Session		Link to website		Requested consultation What is the extent or capacity of resources for emergency response? What is the financial capacity to address emergencies?	Relevant matter	Beach explained it has a contract with AMOSC to manage emergency response. AMOSC have significant resources in terms of people and equipment. Gas proponents would work together to offer expertise and support as well. Beach's emergency response plans have to include its preparedness arrangements, be included in EPs, and be reviewed and accepted by the regulator. Beach explained that it has insurance in place for these matters.	
E34443	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38773	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 268435463 - Scott Portelli Photography

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36538	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36539	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35381	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33733	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34447	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38775	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 25165843 - Seamaster Fishing Supplies

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33749	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34463	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38778	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 1714 - Twelve Apostles Tourism and Business Group

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36611	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36612	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36613	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34911	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35186	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35481	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33269	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33536	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33828	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33974	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34248	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34545	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38789	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38790	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38792	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39436	15/01/2024	Email	Incoming	Info sheet update	Project update - general	Acknowledgement of Beach email Acknowledged email received	N/A no objections or claims made	N/A no objections or claims made	

Business Entity ID: 1026 - Watersure, Victorian Desalination Plant

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36637	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36638	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35512	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33858	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34576	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38794	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 4838 - Abalone Council Australia Ltd

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36655	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34914	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33272	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33977	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38797	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1456 - Abalone Council Victoria

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36656	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34916	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33275	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33980	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38798	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38799	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38800	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1457 - Abalone Victoria Central Zone

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36657	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34919	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33277	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33279	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33984	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38802	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38804	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 155189264 - Allfresh Seafood

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36659	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34925	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33280	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33985	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38805	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 987 - ANZT Fishing Company

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36660	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34926	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33281	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33986	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38806	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1470 - Apollo Bay Fisherman's Cooperative

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36661	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34931	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33285	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33286	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33991	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38807	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38808	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 4194523 - Atlantis Fisheries Consulting Group

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36662	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34938	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33293	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33998	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38809	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

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Commercial Fishing Entity ID: 991 - Australian Southern Bluefin Tuna Industry Association

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36664	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34962	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33316	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34021	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38811	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38812	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 4194356 - Australian Wildcatch Fishing (Corporate Alliance Enterprises)

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36665	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34964	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33318	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34023	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34680	22/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E38813	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38814	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 992 - Bass Strait Scallop Industry Association

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36666	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34973	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33327	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34032	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38815	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1485

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36667	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34982	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33336	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34043	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38817	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 25165849 - Bermagui Fishermen's Co-op

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34044	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38818	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1492

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36669	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34993	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33343	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34051	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38819	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38821	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38823	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 4194603

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36670	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34995	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33345	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34053	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38825	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 994 - Commonwealth Fisheries Association

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36671	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35021	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35535	14/07/2023	Email	Incoming	Info sheet	Project update - general	N/A no response received Thanked Beach for trying to something different with the proposed joint peak bodies meeting and for acknowledging the burden offshore activities are putting on the fishing sector. They confirmed they do not have scope to partake in any consultation.	N/A no response received	N/A no response received	
E35536	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33369	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34077	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38826	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 239075452 - Coorong Wild Seafood

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36672	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35036	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33386	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34094	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38827	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 268435472 - Eastern Zone Abalone Industry Association

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36675	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35129	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33481	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34191	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38829	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 239075454 - Ferguson Australia

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36676	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35141	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33497	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34209	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38830	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 25165861 - Fishermen Direct Pty Ltd

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39607	30/01/2024	Email	Incoming		Project update - locations	Requested further information The Corner Inlet Fishery need to be informed of drilling impacts on king george whiting spawning and recruitment processes.	Relevant matter Agree, need to be informed and will add to mailing list and share info sheets.	N/A no objections or claims made	
E39611	30/01/2024	Email	Outgoing	Link to website	Project update - locations	Requested further information Provided link to latest VFA report	Relevant matter Beach agrees the fishery needs to understand drilling activities.	The VFA has published a more recent study which can be found on their website The report identifies the spawning locations of King George whiting in Victorian waters This states that most of the spawning grounds are off South Australia far west Victoria.	

Commercial Fishing Entity ID: 1002 - Fishwell Consulting

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36677	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35159	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33508	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34217	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34218	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34219	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34220	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38831	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38832	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38833	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38834	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1546

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36678	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35169	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33518	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34230	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38835	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1467 - Great Ocean Abalone

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36681	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35182	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33531	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34243	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38836	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 25165841 - Hursey Seafoods

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33546	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34259	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38837	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1574

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36683	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35213	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33553	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34266	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38838	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 239075455

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36685	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35215	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33555	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34268	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38840	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1580

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36686	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35216	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33556	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34269	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38841	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1585

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36687	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35219	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33559	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34272	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38842	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 268435527 - King Island Seafoods

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36431	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36688	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35234	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33572	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34285	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38843	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 4194605

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36689	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35238	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33576	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34289	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38844	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 268435473 - Lakes Entrance Fishermen's Co-operative

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36690	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35239	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33577	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34290	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38845	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1709 - MacTaggart Marine

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36692	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35257	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33595	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34308	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38846	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 239075466

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36695	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35268	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33607	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33957	20/11/2023	Email	Incoming	Link to website	Project update - locations	Requested consultation Requested webinar details	N/A no objections or claims made	N/A no objections or claims made	
E33955	20/11/2023	Email	Outgoing	Link to website	Project update - locations	Requested consultation Webinar registration details shared.	N/A no objections or claims made	N/A no objections or claims made	
E34320	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38847	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
Commercial Fishing Entity ID: 4194608y									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36696	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35270	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33609	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34323	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38848	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
Commercial Fishing Entity ID: 1003 - Muollo Fishing									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33620	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34334	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38849	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
Commercial Fishing Entity ID: 1004 - Mures Fishing									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35280	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33621	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33622	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34335	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34336	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38850	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38851	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
Commercial Fishing Entity ID: 4852 - Ocean Road Abalone (Southern Ocean Mariculture)									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36699	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35290	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33632	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34346	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E38852	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 4889 - Paaratte Eel Company

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36700	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35309	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33656	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34370	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38853	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 4194609

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36701	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35321	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33668	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34382	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38854	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 239075475

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36702	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35322	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33669	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34383	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38855	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 239075411 - Petuna Sealord Deepwater Fishing Pty Ltd

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36703	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35332	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33679	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34393	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38856	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 4768 - Port Campbell Lobster

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36704	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35339	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33686	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34400	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38857	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1653 - Port Campbell Professional Fishermans Association

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36705	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35341	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35342	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33688	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33689	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34402	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34403	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38858	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38859	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1666 - Ray Wicks Fishing Co

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36707	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E33715	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34429	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38860	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

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Commercial Fishing Entity ID: 1681 - RHG Fisheries

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36708	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35368	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35369	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33719	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33720	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34433	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34434	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38861	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38862	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1694 - Richey Fishing Company

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36709	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34974	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35370	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33328	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33721	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34033	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34435	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38816	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38863	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1670

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36710	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35373	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33724	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34438	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E38864	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 4194611

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36711	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35375	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33726	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34440	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38865	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 268435471 - San Remo Fishing Co-operative

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36712	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35377	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33728	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34442	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38866	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1006 - Scallop Fishermen's Association of Tasmania Inc

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36714	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35378	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35379	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33730	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33731	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34444	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34445	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38867	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38868	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

beach

Commercial Fishing Entity ID: 155189275 - Seafood Industry Australia

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36715	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35390	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34906	31/08/2023	Meeting - online			Project update - general	Requested consultation Attended Beach Energy's Commercial Fishing Peak Bodies round table.	N/A no objections or claims made	N/A no objections or claims made	
E36193	14/09/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33742	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34454	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38717	5/01/2024	Email	Outgoing	Info sheet	Project update - general	N/A no response received Follow-up with SIA with finalised fishing effort report attached	N/A no response received	N/A no response received	
E39550	23/01/2024	Email	Outgoing		Project update - general	N/A no response received Beach notified relevant control measures.	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1008 - Seafood Industry Victoria

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36716	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35540	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35548	21/08/2023	Email	Incoming		Project update - general	Requested consultation SIV confirmed they have shared our Warrnambool fishing invite with their relevant members.	N/A no objections or claims made	N/A no objections or claims made	
E34905	31/08/2023	Meeting - in person			Project update - general	Requested consultation Commercial fishing Peak Bodies round table.	N/A no objections or claims made	N/A no objections or claims made	
E36194	14/09/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33748	14/11/2023	Email	Outgoing	Link to website	Project update - locations	Acknowledgement of Beach email	N/A no objections or claims made	N/A no objections or claims made	
E38699	16/11/2023	Email	Outgoing	Link to website	Project update - locations	Acknowledgement of Beach email	N/A no objections or claims made	N/A no objections or claims made	
E34617	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34618	21/11/2023	Email	Incoming	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34457	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34458	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34459	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34460	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34462	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34896	23/11/2023	Email	Incoming		Project update - general	Requested consultation SIV provided updated version of their policy and service agreement.	N/A no objections or claims made	N/A no objections or claims made	
E38284	14/12/2023	Email	Incoming		Project update - general	Requested consultation Updating our agreement with SIV	Relevant matter New agreement needs to be executed.		
E39442	15/01/2024	Email	Incoming	Info sheet update	Project update - general	Requested consultation SIV confirmed info shared with members.	N/A no objections or claims made	N/A no objections or claims made	
E39552	23/01/2024	Email	Outgoing		Project update - general	N/A no response received Beach advised relevant control measures developed.	N/A no response received	N/A no response received	Additional measures or controls added to EP to address potential impacts CM03: Consultation for Implementation of EP
E39613	31/01/2024	Email	Incoming		Project update - locations	Raised objection or claim The Victorian Rock Lobster Committee (subcommittee of SIV) has commented on the relatively small coastline off Victoria compared to other States, and highly localised habitat for species such as Southern Rock Lobster and Giant Crab which limit the locations available for fishers to productively harvest. The VRLC has recommended an appropriate compensation protocol be developed for Victorian commercial fishing licence holders displaced from historical fishing grounds by offshore development activity (and associated exclusion zones) that does not require them to relocate their fishing effort and risk localised stock depletion or increased competition between licence holders in other areas. The VRLC are aware that temporary 'retirement of quota', whereby operators abstain from fishing for the relevant period and are compensated for loss of revenue based on historical catch rates and current market price, has been used successfully in the past by oil and gas companies operating in the Southern Ocean.	Objection or claim does not have merit Beach Energy has a Fair Ocean Access Policy and accompanying compensation procedure that has been developed with input from the commercial fishing industry.	Beach has previously shared its Fair Ocean Access Policy and compensation procedures with SIV and the broader commercial fishing industry. We are happy to take feedback on both and are open to broader industry wide discussions on the appropriateness of consistency of current compensation mechanisms.	No additional measures or controls are required
E39619	1/02/2024	Phone	Outgoing			Requested consultation Victorian Rock Lobster Committee raised that compensation mechanisms need to reflect the unique attributes of the species and the Victorian coastline and habitat. Should new information be received on fishing locations in relation to the activities in this EP, it will be assessed and where appropriate, Beach will assess any new matters and where appropriate, Beach will apply its Management of Change Standard (section 8.3.4.).	Relevant matter Beach agrees that compensation mechanisms need to respect the different impacts on fishers based on activity, location and species.	Beach explained that our procedure purposely includes a mechanism for an adaptive procedure where applicable. Beach would seek to use an adaptive mechanism for anyone Relevant Persons directly impacted and recognising no location, activity or species is the same. Beach and SIV agreed to have further discussions once the exact well locations are known and specific impacted parties are identified. This will include the development of any adaptive compensation mechanisms.	No additional measures or controls are required

Commercial Fishing Entity ID: 1009 - South Australian Rock Lobster Advisory Council and South Eastern Professional Fishermen's Association

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36717	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35400	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33753	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34467	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38869	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 25165848 - South Coast Fish Processors

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34468	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38870	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 25165846 - South Coast Mariculture

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34469	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38871	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1010 - South East Trawl Fishing Industry Association

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36718	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35401	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E36047	22/08/2023	Email	Incoming	Info sheet	Project update - general	Requested consultation GPS coordinates of operational areas shared.	N/A no objections or claims made	N/A no objections or claims made	
E36195	14/09/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33754	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E39481	14/11/2023	Email	Incoming	Link to website	Project update - general	Raised objection or claim SETFIA (2023) recommended that Beach avoid depths between the 400 - 1000m isobaths to minimise the impact on fishing. Identified an extra fishing gear type to previous comprehensive report on fishing gear and impacts and risks commissioned by Beach (2019).	Objection or claim has merit Beach has developed a control measure based on the feedback from SETFIA.	Beach has developed a control measure which will limit any proposed well locations to >400 m. This limitation reduces any potential impact to commercial trawl and giant crab fisheries that were identify by SETFIA (2023) as having most fishing effort between the 400 and 1,000 m isobath. SETFIA (2023) recommended that Beach avoid depths between the 400 - 1000m isobaths to minimise the impact on fishing. Beach will develop a consultation and comms plan to continue to consult with commercial fishers including SETFIA in relation to well locations and the process for compensation if fishing exclusion is unavoidable.	Additional measures or controls added to EP to address potential impacts Control Measure: Drilling Program. Beach will implement an activity limitation where wells will not be located in water depths >400 m. This applies to the T/30P Operational Area where waters depths range from 55 – 992 m (T/30P South OA) and 111 – 578 m (T/30P North OA). Water depths > 400 m have not been fully excluded from the activity as anchors may be required in these waters depths depending on the final well location. CM03: Drilling Program Consultation and Communication Plan. Beach will continue to consult with commercial fishers including SETFIA in relation to well locations and the process for compensation if fishing exclusion is unavoidable.
E33999	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34470	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34716	22/11/2023	Email	Incoming	Link to website	Project update - locations	Requested consultation Confirmation of reminder for webinars and Lakes Entrance drop-in to SETFIA members	N/A no objections or claims made	N/A no objections or claims made	
E34717	22/11/2023	Email	Incoming	Link to website	Project update - locations	Requested consultation Confirmation of reminder for webinars and Lakes Entrance drop-in to SETFIA members	N/A no objections or claims made	N/A no objections or claims made	
E37322	4/12/2023	Meeting - in person			Project update - locations	Requested consultation Face to face meeting in Lakes Entrance to discuss OGV drilling and P&A activities.	N/A no objections or claims made	N/A no objections or claims made	
E39545	23/01/2024	Email	Outgoing		Project update - locations	Requested consultation SETFIA (2023) recommended that Beach avoid depths between the 400 - 1000m isobaths to minimise the impact on fishing. Should new information be received on fishing locations in relation to the activities in this EP, it will be assessed and where appropriate, Beach will assess any new matters and where appropriate, Beach will apply its Management of Change Standard (section 8.3.4).	Objection or claim has merit Beach has developed a control measure based on the feedback from SETFIA.	Beach has developed a control measure which will limit any proposed well locations to >400 m. This limitation reduces any potential impact to commercial trawl and giant crab fisheries that were identify by SETFIA (2023) as having most fishing effort between the 400 and 1,000 m isobath. SETFIA (2023) recommended that Beach avoid depths between the 400 - 1000m isobaths to minimise the impact on fishing. Beach will develop a consultation and comms plan to continue to consult with commercial fishers including SETFIA in relation to well locations and the process for compensation if fishing exclusion is unavoidable.	Additional measures or controls added to EP to address potential impacts Control Measure: Drilling Program. Beach will implement an activity limitation where wells will not be located in water depths >400 m. This applies to the T/30P Operational Area where waters depths range from 55 – 992 m (T/30P South OA) and 111 – 578 m (T/30P North OA). Water depths > 400 m have not been fully excluded from the activity as anchors may be required in these waters depths depending on the final well location. CM03: Drilling Program Consultation and Communication Plan. Beach will continue to consult with commercial fishers including SETFIA in relation to well locations and the process for compensation if fishing exclusion is unavoidable.

Commercial Fishing Entity ID: 239075453 - Southern Fishermen's Association Inc.

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36719	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35037	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33387	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34095	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38828	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1011 - Southern Rock Lobster Limited

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36720	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35416	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33767	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34483	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E38872	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38873	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1689 - Southern Shark Industry Alliance (SSIA)

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36721	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34940	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33295	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34000	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38810	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 268435528

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36722	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35428	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33776	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34492	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38874	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 25165842 - Strait off the Boat

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33777	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34493	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38875	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1696 - Sustainable Shark Fishing Association

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36724	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35442	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33789	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34505	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E38876	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 4912 - Tasmania Salmonid Growers Association

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36598	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36725	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35445	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35446	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33792	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33793	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34508	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34509	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38877	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38878	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1698 - Tasmanian Abalone Council Ltd

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36726	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35447	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33794	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34510	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38879	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1017 - Tasmanian Rock Lobster Fisherman's Association

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36727	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35452	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33795	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34511	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38880	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
Commercial Fishing Entity ID: 1018 - Tasmanian Seafood Industry Council									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36728	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35454	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E36196	14/09/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33797	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no objections or claims made	N/A no response received	
E34514	21/11/2023	Email	Outgoing	Link to website	Project update - general	Requested consultation	N/A no response received	N/A no response received	
E34894	23/11/2023	Email	Outgoing		Project update - locations	Requested consultation	Relevant matter	N/A no objections or claims made	
E38700	23/11/2023	Email	Incoming		Project update - locations	Acknowledgement of Beach email Understand that Beach's proposed activities have some overlap with Tasmanian fisheries. Suggested we organise a time for a video catchup to better understand your proposed operations, what role Seafood Industry Tasmania could play in you consultation processes	Relevant matter Beach acknowledges the need to engage with TSIC and has been attempting to for a number of months.	N/A no objections or claims made	
E36749	27/11/2023	Email	Outgoing		Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E38701	29/11/2023	Email	Outgoing		Project update - locations	Requested consultation Beach acknowledged the burden of consultation and will explore how best to work with TSIC	N/A no objections or claims made	N/A no objections or claims made	
E38702	29/11/2023	Email	Incoming		Project update - locations	Requested consultation Agreed meeting	N/A no objections or claims made	N/A no objections or claims made	
E37338	6/12/2023	Meeting - online			Project update - locations	Raised objection or claim Raised concerns that King Island fishers had not been consulted on the project. Agreed at meeting that once exact well locations are are firmed up more specific engagement can occur with those directly impacted.	Objection or claim does not have merit Beach has been sharing information with SIT/TSIC since May 2023. Beach commissioned a thorough fishing effort report from SETFIA that indicates no Tasmania fishing in the proposed operational areas.	Beach acknowledges the requirement to engage with the Tasmanian commercial fishing sector and is open to a service agreement with SIT/TSIC. Further engagement with those members potentially impacted will occur when specific well locations are firmed up.	
E38278	12/12/2023	Email	Outgoing		Project update - locations	Requested further information Summary of meeting and sharing of contacts Beach has shared info with.	Relevant matter Confirmed we have been sharing info since May 2023		
E38686	3/01/2024	Email	Incoming		Project update - locations	Raised objection or claim Letter received from TSIC stating concern that they have not been engaged early enough.	Objection or claim does not have merit Beach has reviewed logs and has confirmed information has been shared since May 2023. TSIC invited to peal bodies meeting with other fishing peak bodies. SETFIA report has been shared with TSIC		
E39441	15/01/2024	Email	Incoming		Project update - locations	Requested consultation TSIC replied they have received all the OGV information but it wasn't clear as to relevance to them.	Relevant matter Beach will take advice on board and try to make subject relevance clearer in emails.	N/A no objections or claims made	
E39546	23/01/2024	Email	Outgoing			Requested consultation Notification to TSIC that Beach will	N/A no response received	N/A no response received	Additional measures or controls added to EP to address potential impacts

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						implement an activity limitation where wells will not be located in water depths >400 m. Should new information be received on fishing locations in relation to the activities in this EP, it will be assessed and where appropriate, Beach will assess any new matters and where appropriate, Beach will apply its Management of Change Standard (section 8.3.4.).			CM03: Consultation for Implementation of EP

Commercial Fishing Entity ID: 155189276 - Tasmanian Seafoods

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36729	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34918	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35455	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33278	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33798	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33983	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34515	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38803	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38881	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 25165839 - Tassal

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33801	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33802	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34518	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34519	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38882	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38883	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 4194360 - Toberfish

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36730	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35472	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33818	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34535	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38884	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1021 - Top Fish Tasmania

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36731	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34990	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34992	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34994	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33340	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33342	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33344	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34048	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34050	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34052	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38820	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38822	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38824	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1712

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36732	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35477	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33824	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34541	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38885	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1023 - Trinsand Fisheries

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36733	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35214	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35478	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33554	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33825	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34267	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34542	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38839	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38886	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1713 - Tuna Australia

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36734	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35479	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35480	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34907	31/08/2023	Meeting - online			Project update - general	Requested consultation Commercial fishing peak bodies meeting.	N/A no objections or claims made	N/A no objections or claims made	
E36197	14/09/2023	Email	Outgoing	Info sheet update	Project update - general	N/A no response received Sent copies of Beach's Fair Ocean Access Policy and compensation procedure to commercial fishing peak bodies. Action from peak bodies round table.	N/A no response received	N/A no response received	
E33826	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33827	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E38698	16/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34543	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34544	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38697	4/01/2024	Email	Outgoing		Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39547	23/01/2024	Email	Outgoing		Project update - general	N/A no response received Beach notified relevant control measures developed.	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1721 - Victorian Scallop Fishermen's Association

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36736	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35493	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35494	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35495	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33840	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33841	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33842	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34557	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34558	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34559	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E37317	4/12/2023	Email	Outgoing	Link to website	Project update - map	Requested consultation Met fisher at Lakes Entrance drop-in. He requested copies of the operational maps.	N/A no objections or claims made	PDF of operational maps sent.	
E38887	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38888	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38889	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1729 - Warrnambool Professional Fishermen's Association

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36737	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35506	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33852	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34570	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38890	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1733

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36738	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35520	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33863	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34581	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38891	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1734 - Western Abalone Divers Association

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36739	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35524	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35525	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33276	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33869	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33870	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33981	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34587	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34588	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38801	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38892	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38893	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 268435497 - Wild Life Fisheries

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36740	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35526	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33871	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34589	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38894	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 268435538 - Women in Seafood Australasia

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35531	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33875	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34593	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38895	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1741

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36742	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35534	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33878	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34596	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38896	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commonwealth Government Entity ID: 41943052 - Federal Member for Wannon

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36297	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35061	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33411	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34119	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38907	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commonwealth Government Entity ID: 5004 - Federal Member for Braddon

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36387	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36388	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35170	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35171	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33519	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33520	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34231	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34232	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E38921	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38922	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Community Entity ID: 4194734

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35062	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33412	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34120	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38927	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Community Entity ID: 268435520 - French Island Community Group

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35164	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33511	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34223	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38929	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Community Entity ID: 264241166 - Lang Lang District Business and Community Group

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39473	19/10/2023	Meeting - in person			Project update - general	Requested consultation Spoke to a group of around 20. Shareed info and showed maps. No concerns raised.	N/A no objections or claims made	N/A no objections or claims made	
E33580	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34293	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38930	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Community Entity ID: 1593 - Lang Lang Gas Plant Environment Liaison Group

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35243	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33581	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34297	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38934	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

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Community Entity ID: 25165827 - Other Contact

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33643	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34357	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38936	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Community Entity ID: 25165826 - Other Contact

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33644	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34358	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38937	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Community Entity ID: 243269635 - Other Contact

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34988	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Community Entity ID: 268435545 - Other Contact

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33645	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34359	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38938	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Community Entity ID: 25165850 - Other Contact

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34888	23/11/2023	Email	Incoming		Project update - general	Requested further information Why did the Advertisement only appear in the paper today, with first session this evening, when these sessions would have been planned for some time? What other platforms have you accessed to ensure those in regional/rural/remote areas have access to the project information, including the webinars? What capacity will the public have to actively engage in the process of discussion? Where can the projects technical information be accessed so that the public can be thoroughly informed? Where has it been demonstrated that new Gas projects provide long term benefit to the community and the environment, particularly in light of rapidly escalating climate crisis?	Relevant matter Beach will respond to questions raised.	N/A no objections or claims made	
E34889	23/11/2023	Email	Outgoing		Project update - general	Raised objection or claim Response to questions.	Relevant matter This member of the public does not live in an area close to having shoreline impact.	We have advertised the project previously across several local newspapers, including	

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
							They have no functions, interests or activities impacted by the activity.	The Advertiser, with the aim of identifying those who may be impacted. We currently have over 1,000 individual email addresses on the project mailing list with a broad spectrum covering local councils, state departments, commercial fishers, marine users, local businesses, emergency responders, parks authorities, individual community members, community groups, and environmental groups amongst many others. These all receive regular updates including information sheets with further information and details of webinars and community drop-ins. There were two further webinars advertised for the following week and offered to engage directly with anyone that should wish. We have also recently launched our engagement hub, Engage Beach. The regulator will also run a public consultation period and Beach will ensure our mailing list is informed of when that process commences. The most recent Gas Statement of Opportunities, published by the Australian Energy Market Operator (AEMO), illustrates the critical role gas-fired generation plays, and will continue to play, in the reliable operation of the electricity supply system. Beach has operated and non-operated facilities that are covered by the federal government's Safeguard Mechanism. Our target to reduce equity emissions intensity by 35% by 2030 is aligned with the recent reforms to the Safeguard Mechanism. We have a pipeline of emissions reduction opportunities under consideration that will enable us to reduce emissions at our covered facilities.	
E38939	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Community Entity ID: 268435546 - Other Contact

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33646	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34360	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34625	21/11/2023	Email	Incoming	Link to website	Project update - general	N/A no response received Requested webinar details.	N/A no response received	N/A no response received	
E34626	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38940	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
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Community Entity ID: 1655 - Port Campbell Progress Association

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36507	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36508	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35343	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35344	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33690	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33691	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34404	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34405	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38956	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38957	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Community Entity ID: 1703 - Timboon Action Group

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36602	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36603	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36604	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36605	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35467	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35468	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35469	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35470	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33813	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33814	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33815	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33816	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34530	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
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Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34531	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34532	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34533	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38960	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38961	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38962	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38963	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Education and Research Organisations Entity ID: 268435516 - AusOcean

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36211	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34941	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33296	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34001	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38964	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Education and Research Organisations Entity ID: 1489 - Blue Whale Study Inc

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36250	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34984	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33338	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34046	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39457	16/12/2023	Email	Incoming			Requested consultation Request to share sighting data with Australian Institute of Marine Science.	N/A no objections or claims made	N/A no objections or claims made Data shared with AIMs with agreement from Blue Whale Study and Beach Energy.	
E38965	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Education and Research Organisations Entity ID: 996 - Deakin University - School of Life and Environmental Sciences

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36298	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36299	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36300	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36301	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36302	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36303	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36311	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35070	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33420	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34128	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38971	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Education and Research Organisations Entity ID: 268435478 - Dolphin Research Institute

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36357	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35120	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33477	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34186	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38972	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Education and Research Organisations Entity ID: 4194528 - Fisheries Research and Development Corporation

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36374	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35155	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33504	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34214	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38975	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Education and Research Organisations Entity ID: 1564 - Institute for Marine and Antarctic Studies, University of Tasmania

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36406	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36407	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	

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Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36408	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36409	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36410	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36411	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36412	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36413	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35208	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35209	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35210	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35211	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33548	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33549	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33550	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33551	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34261	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34262	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34263	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34264	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38976	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38977	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38978	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38979	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Education and Research Organisations Entity ID: 268435525 - King Island Marine Research

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36427	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36428	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35233	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33571	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34284	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38980	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Environmental Conservation Groups Entity ID: 4194724 - Apollo Bay Landcare

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36206	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34928	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33283	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33988	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38725	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Environmental Conservation Groups Entity ID: 4949 - Australian Coastal Society - Victorian Chapter

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36214	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34944	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33299	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34003	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34004	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38981	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38982	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Environmental Conservation Groups Entity ID: 268435459 - Australian Conservation Alliance

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36218	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34948	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33302	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34007	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E38983	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Environmental Conservation Groups Entity ID: 239075467 - Australian Conservation Foundation

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36219	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34949	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33303	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34008	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38984	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Environmental Conservation Groups Entity ID: 4953 - Australian Marine Conservation Society

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36222	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34952	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33306	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34011	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38985	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Environmental Conservation Groups Entity ID: 239075345 - Beach Patrol 3280

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36247	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34980	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33333	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34038	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38986	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Environmental Conservation Groups Entity ID: 268435530 - Beyond Gas Network

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34983	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33337	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34045	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E38987	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Environmental Conservation Groups Entity ID: 4945 - Environment Tasmania

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36367	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35136	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33489	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34201	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38988	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Environmental Conservation Groups Entity ID: 1536 - Environment Victoria

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36368	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35137	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33490	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34202	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38989	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Environmental Conservation Groups Entity ID: 268435547 - Fight for the Bight

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33501	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34213	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34895	23/11/2023	Email	Incoming		Project update - general	Raised objection or claim Feels one of Beachs Q&A answers on info sheet is misleading.	Objection or claim does not have merit Not relevant to OGV. References used are from the AEMO ISP 2022.		
E34892	23/11/2023	Email	Incoming		Project update - general	Requested consultation Concerns around some of our info sheet wording being misleading.	Not a relevant matter Info sheet quote the AEMO ISP 2022.		
E34893	23/11/2023	Email	Outgoing		Project update - general	Requested consultation Agreed to redraft info sheet Q&A answer.	Not a relevant matter Words are from the AEMO ISP 2022		
E38993	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39440	15/01/2024	Email	Outgoing		Project update - general	Requested further information Invitation to attend a Q&A panel on seismic surveys.	Not a relevant matter OGV does not have any seismic activity associated with it.		
E39452	15/01/2024	Email	Incoming		Project update - general	Requested further information 1. Beach Energy is a potential customer of	Not a relevant matter Not relevant to OGV.	N/A no objections or claims made Not relevant as OGV has no seismic survey	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						CGG's Regia project. 2. Beach Energy is planning the use of land/ocean based seismic. 3. Beach Energy may use seismic for future projects.		activity.	

Environmental Conservation Groups Entity ID: 268435460 - Friends of the Earth - Melbourne Chapter

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36383	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35166	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33513	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34225	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38994	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Environmental Conservation Groups Entity ID: 268435461 - Greenpeace

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36403	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35192	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33542	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34255	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38995	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39434	15/01/2024	Email	Incoming	Info sheet update	Project update - general	Acknowledgement of Beach email Acknowledged email	N/A no objections or claims made	N/A no objections or claims made	

Environmental Conservation Groups Entity ID: 1565 - International Fund for Animal Welfare

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36414	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35212	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33552	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34265	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38996	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Environmental Conservation Groups Entity ID: 239075461 - King Island Landcare

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36425	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36426	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35227	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35231	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35232	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33566	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33569	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33570	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34279	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34282	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34283	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38997	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39000	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39001	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Environmental Conservation Groups Entity ID: 239075427 - Marine Mammal Foundation

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36448	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35259	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33597	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34310	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39002	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Environmental Conservation Groups Entity ID: 264241156 - Nelson Coast Care Inc

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36466	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35285	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33627	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34341	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39003	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Environmental Conservation Groups Entity ID: 268435475 - OceanWatch Australia

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36471	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35291	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33633	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34347	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39004	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Environmental Conservation Groups Entity ID: 4755 - Otway Climate Emergency Action Network (OCEAN)

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36479	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35301	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33650	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34363	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39006	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Environmental Conservation Groups Entity ID: 1650 - Port Campbell Community Group

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36503	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35337	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33684	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34398	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39007	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Environmental Conservation Groups Entity ID: 268435543 - Protect the West

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39474	26/07/2023	Info Session			Project update - general	Requested consultation 2 reps from Protect the West attended our Warrnambool drop-in. As well as a number of general questions they were interested in P&A and impact of drilling on whales. Do we drill at night?	Relevant matter Questions are relevant but no objection or claims were raised.	We do drill at night. During the whale migratory / foraging periods we are monitoring with marine fauna observers on all of our vessels.Should whales be sighted within a certain radius of the rig we have a	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						Do we monitor P&A wells? What material is used for P&A? Do we remove subsea infrastructure once no longer needed?		management plan that details how and when operations are shut down and able to recommence. This plan and the radius are based upon significant duration sound monitoring to validate / improve on the theoretical modelling of sound of the rig and vessel activities. The plan addresses nigh time activity based upon sightings immediately prior to sunset and assuming that any whales in the area of impact at that time will remain throughout the night We monitor suspended wells very closely every one to two years to ensure there are no issues prior to undertaking final abandonment. For example, the wells we would be abandoning in this campaign have been monitored in a suspended state, where the productive formations have been plugged and isolated with cement and mechanical means, for 10 years or more with no indication of issues giving us the confidence that the final abandonment will be successful with no need for further monitoring. We use the appropriate grade of cement for the specific downhole conditions of pressure, temperature and formation fluid as per the guidelines for well abandonment published by Oil and Gas UK and Norsok (Norway regulations) UKOG and Norsok are the recognised expertise in the plug and abandonment space. We are also reviewing the use and applicability of other wellbore sealing materials that have come into use replacing / augmenting cement in abandonments in the UK and Norway offshore. Beach is required to remove all offshore infrastructure at the end of field life. If there is a proven environmental benefit of leaving a structure /equipment in place (i.e., as a reef for nursery species) then Beach must apply for an exemption for this removal.	
E35546	16/08/2023	Email	Outgoing		Project update - general	Requested consultation Summary of Q&A from drop-in session chat with Protect the West	N/A no objections or claims made		
E35547	16/08/2023	Email	Outgoing		Project update - general	Requested consultation Summary of Q&A from drop-in session chat with Protect the West	N/A no objections or claims made		
E33712	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33713	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34426	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34427	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34883	23/11/2023	Email	Outgoing		Project update - locations	Requested consultation	N/A no objections or claims made	N/A no objections or claims made	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						Webinar registration details shared.			
E34898	23/11/2023	Email	Incoming		Project update - locations	Requested consultation Requested details of P&A technical webinar.	N/A no objections or claims made	N/A no objections or claims made	
E39008	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39009	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received Consultation in the course of preparation of the EP has been completed in accordance with the OPPGS (E) Regulations. Beach engages in ongoing consultation during the implementation of this EP and Relevant Persons can provide feedback to Beach on any new relevant matters that may emerge. Beach will assess any new matters and where appropriate, Beach will apply its Management of Change Standard (section 8. 3.4.).	N/A no response received	N/A no response received	

Environmental Conservation Groups Entity ID: 4830 - Surfers For Climate

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36590	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36591	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35435	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35436	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33783	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33784	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34499	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34500	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39010	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39011	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Environmental Conservation Groups Entity ID: 79691782 - Surfrider Foundation Australia

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36592	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36593	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36594	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36595	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35437	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35438	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35439	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35440	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33785	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33786	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33787	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33788	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34501	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34502	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34503	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34504	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39012	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39013	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39014	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39015	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Environmental Conservation Groups Entity ID: 1718 - Victorian National Parks Association

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36622	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36623	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35491	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35492	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33838	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33839	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34555	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34556	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39016	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39017	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Environmental Conservation Groups Entity ID: 4814 - Warrnambool Coastcare Landcare Network

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36630	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36631	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35504	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35505	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33849	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33850	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34567	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34568	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39018	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39019	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Environmental Conservation Groups Entity ID: 264241161 - Wilderness Society Tasmania

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36649	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35527	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33872	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34590	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39020	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Environmental Conservation Groups Entity ID: 1737 - Wilderness Society Victoria

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36650	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35529	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33499	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34591	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39021	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
Indigenous Entity ID: 239075474 - Aboriginal Land Council of Tasmania									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39569	21/03/2023	Email	Outgoing	Info sheet	Project introduction	Advised other contacts at organisation Provided RP an update on offshore activities and and outlined the purpose of consultation. RP advised they would forward email to relevant person within the organisation.	N/A no objections or claims made	N/A no objections or claims made	
E39570	21/03/2023	Email	Incoming	N/A		Advised other contacts at organisation RP advised that she has again forwarded email onto relevant people within the organisation.	N/A no objections or claims made	N/A no objections or claims made	
E39572	5/06/2023	Email	Outgoing	Info sheet	Project introduction	Acknowledgement of Beach email Email sent to RP following a phonecall. Discussed Beach offshore activities and upcoming drilling campaign. Advised RP purpose of consultation under the regulations. Requested an opportunity to meet with RP and.	N/A no objections or claims made	N/A no objections or claims made	
E39579	5/06/2023	Email	Outgoing			Email outgoing. Advised RP of upcoming OGV activities, which include seabed assessment (non seismic) and a drilling campaign. Provided dates for the upcoming campaign. Advised RP of the purpose for consultation under the regulations.	N/A no objections or claims made	N/A no objections or claims made	
E39571	6/06/2023	Email	Incoming	N/A		Advised don't want further consultation RP expressed a concern against the oil and gas industry more broadly,climate change and in particular raised conserns about seismic activities and the impact on the marine ecosystyem. RP has expressed formal opposition to the exploration of gas in the Bass strait. RP advised that they are not sure what could be gained from further engagement.	Not a relevant matter RP's broad opposition to the industry and in particular seismic activity is not relevant to the activities in this EP	N/A no objections or claims made	
E39573	30/08/2023	Email	Outgoing	Info sheet		Email outgoing. Responded to RP's previous email outlining concerns regarding impact of climate change and seismic activities on sea country. Advised RP that their opposition to our activities is included in our consultation records to NOPSMA. Advised RP that consultation is an ongoing process and we will remain open to consultation. Acknowledged RP concerns around climate change and shared with them our sustainability report to share with them that we as an industry understand the need to reduce emissions. Advised RP of the need for gas in the energy transition. Advised RP that whilst our offshore gas Victoria project does not include seismic, our environment team addressed some of the	Not a relevant matter RP's has a broad objection to the ofshore gas industry. The concerns raised about the impact of seismic on marine species are not relevant to the activities in this EP.	N/A no objections or claims made	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						concerns regarding mutton-birds, plankton and whales. Advised RP that avoidance and disturbance to whales is managed in accordance with EPBC regulations to minimise any impacts to whales. Advised RP of the role of MMO in mitigating these risks. Advised RP again that our activities are not seismic and and advised RP that whale strandings, whilst distressing, are not linked to seismic. Advised RP we understand the need for culturally appropriate engagement and that we will remain open to any future consultation, should they have any concerns to discuss.			
E39574	30/08/2023	Email	Outgoing			Email outgoing. Advised RP I had received an automattic response from RP within the organisation and requested the correct details to send emails too.	N/A no objections or claims made	N/A no objections or claims made	
E39575	1/09/2023	Email	Incoming			Acknowledgement of Beach email RP advised the best email address for future correspondence is the email RP is using.	N/A no objections or claims made	N/A no objections or claims made	
E39576	1/09/2023	Email	Outgoing			Email outgoing. Acknowledged RP's email advising of contact details for future correspondence. Asked RP whether she forwards email correspondence onto relevant people within the organisation.	N/A no objections or claims made	N/A no objections or claims made	
E39577	1/09/2023	Email	Incoming			Acknowledgement of Beach email RP confirmed that she forwards any email relevant correspondence onto relevant RP's within the organisation.	N/A no objections or claims made	N/A no objections or claims made	
E39578	1/09/2023	Email	Outgoing			Email outgoing. Thanked RP for confirming that emails are forwarded to relevant RP's within the organisation. Advised RP of the importance of consultation and asked of any additional relevant RP's that may have cultural values or sensitivities. Asked RP if they are able to send any RP contact details.	N/A no objections or claims made	N/A no objections or claims made	
E33934	16/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34624	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39394	10/01/2024	Email	Incoming		Project update - general	Advised don't want further consultation Beach Energy email is not on authorised/permitted senders list for admin@alct.org.au mailbox.	N/A no objections or claims made	N/A no objections or claims made	
E39629	10/01/2024	Email	Outgoing	Link to website	Project update - general	N/A Outgoing email. Advised RP the seabed assessment EP has been accepted by NOPSEMA. Advised RP that consultation for drilling and P&A EP is continuing and will close on 18th January 2024. Advised of timings for when EP is submitted	N/A no response received Beach has provided sufficient information and demonstrated reasonable efforts to consult with RP. In section 6.6.3 of this EP, Beach has documented the cultural values and sensitivities learned through consultation with RP and from RP publications and literature reviews.		Existing measures in EP address potential impacts Control Measure 03: Consultation for Implementation of EP

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						to NOSPEMA Will advise RP when EP is open for public comment so they can participate in that process Advised RP Otway offshore project EP was accepted by NOPSEMA Encouraged RP to participate in consultation Provided link to Engage Beach consultation hub	Consultation for the development of this EP has been completed.		

Indigenous Entity ID: 4194755 - Bega Local Aboriginal Land Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33945	15/11/2023	Phone	Outgoing	N/A	Project introduction	Advised other contacts at organisation Introduced Beach Energy and OGV drilling & P&A project Discussed requirement for consultation Requested contact details for most appropriate person within the organisation to speak to RP advised to send email and they will forward it to relevant person	N/A no objections or claims made	N/A no objections or claims made	
E33944	17/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received Sent email outlining Beach Energy offshore Gas Victoria project Requested, as discussed, to forward email onto relevant people/s Provided description of EMBA Provided RP link to Engage Beach consultation hub Advised RP that we are consulting with relevant state agencies including Australian marine oil spill agency in the event of an emergency Advised of upcoming online webinars for OGV drilling and P&A	N/A no objections or claims made	N/A no objections or claims made	
E34040	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received Reminder to RP's of upcoming drilling and P&A webinars Advised how to register if interested Provided a link to Engage Beach consultation hub	N/A no objections or claims made	N/A no objections or claims made	
E34041	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received Reminder to RP's of upcoming drilling and P&A webinars Advised how to register if interested Provided a link to Engage Beach consultation hub	N/A no objections or claims made	N/A no objections or claims made	
E39364	9/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no objections or claims made	N/A no objections or claims made	
E39365	9/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no objections or claims made	N/A no objections or claims made	

Indigenous Entity ID: 4194761 - Bodalla Local Aboriginal Land Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39328	16/11/2023	Phone	Outgoing		Project introduction	N/A no response received Multiple calls made to RP. Phone rang out, voicemail was left however did not receive any call back. No email contact.	N/A no response received	N/A no response received	
E39512	8/01/2024	Phone	Outgoing		Project introduction	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						Multiple calls made to RP. Phone rang out, voicemail was left however did not receive any call back. No email contact.			
Indigenous Entity ID: 4194731 - Boon Wurrung Foundation									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34985	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34986	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34987	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33917	15/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received Advised RP that previous EP (seabed assessment) has been submitted. Advised that consultation for the next phase (Drilling and P&A) is continuing and dates that consultation will close. Provided RP link to Engage Beach consultation hub. Advised RP of dates and times for the upcoming OGV information webinars. Provided RP an overview of consultation as per regulations.	N/A no objections or claims made	N/A no objections or claims made	
Indigenous Entity ID: 1496 - Bunurong Land Council Aboriginal Corporation									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39589	1/06/2023	Email	Outgoing	Info sheet	Project update - general	Email outgoing. Advised RP of upcoming OGV activities, which include seabed assessment (non seismic) and a drilling campaign. Provided dates for the upcoming campaign. Advised RP of the purpose for consultation under the regulations.	N/A no objections or claims made	N/A no objections or claims made	
E35004	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received Provided RP an update on OGV. Provided RP link to Engage Beach consultation hub. Advised RP of upcoming information sessions	N/A no response received	N/A no response received	
E39720	4/10/2023	Email	Outgoing	N/A		Requested consultation Meeting request. As previously discussed with RP, meeting to discuss OGV and how best to consult with RP. Provided description of the purpose for consultation as per the regulations.	N/A. Meeting request.	N/A. Meeting request.	
E39523	23/10/2023	Email	Outgoing			Requested consultation Advised RP, following consultation with additional RP in the corporation, that we would like to discuss undertaking a cultural values assessment for the OGV project. Requested a time to discuss further with CV Manager.	N/A no objections or claims made	N/A no objections or claims made	
E39524	24/10/2023	Email	Outgoing	N/A		Acknowledgement of Beach email Received schedule of fees from RP, requested a convenient time to discuss development of the assessment.	N/A no objections or claims made	N/A no objections or claims made	
E39521	26/10/2023	Email	Outgoing	N/A	Project update - general		N/A no objections or claims made	N/A no objections or claims made	

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						N/A Outgoing email. Follow up from meeting. Beach met with RP to discuss OGV seabed assessment and broader OGV project activities. RP is a traditional owner and advised that due to the distance offshore and the low impact activity (seabed assessment) they have no concerns. Advised RP the purpose of consultation as per regulations. Discussed planning area and Beach responsibilities when it comes to emergency spill response management. Requested confirmation of the best way to consult with community. RP advised that to continue to consult with RP and they will forward it on, where relevant to social media and communications officer to share broadly. RP advised in relation to consultation material, if possible to reduce the amount of words and include more imagery.			
E39716	26/10/2023	Meeting - online		N/A	Project update - general	Met with manager of environment to discuss previous EP. Outlined the reasons for consultation as per the regulations. Discussed our offshore Gas Victoria project and activities within that project require us to submit an individual environment plan Discussed first activity is the seabed assessment followed by drilling and plug and abandon activities. . RP advised they didn't have any further questions or concerns about the proposed seabed assessment activities due to the assessment due to the distance offshore and minimal impact activities associated with the work. Shared the attached presentation. Discussed the emergency management plan, and how we are required, under the law, to respond to an unlikely event, of a loss of hydrocarbon, which in this case is marine vessel diesel. Spoke about the best way for Beach to engage RP and it's members for our further offshore activities, was advised to continue to consult with Manager and that in addition to that, manager will share the contact details for communications and media officer who can share our project information out with RP community members through newsletters and social media channels. Discussed to consultation material, RP informed Beach that they are very busy and to make project material as succinct as possible and to add more pictures as that helps to picture what we are talking about.	N/A no objections or claims made	N/A no objections or claims made	
E39555	1/11/2023	Meeting - online		N/A		Requested consultation Met with cultural values manager. Discussed requirement to understand cultural values and sensitivities for OGV drilling and P&A EP. Advised that feedback received through	N/A no objections or claims made	N/A no objections or claims made	

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						consultation with other RP representatives, was that due to history and dispossession there was a gap in sea country knowledge. Advised RP that we supported undertaking a cultural values assessment to understand these sensitivities but that the cultural values project would need to align with submission dates for drilling and P&A EP and to satisfy consultation requirements. RP advised that they can accommodate this by staging the project into three phases, the first phase involving community consultation to gain an understating and identify cultural values of sea country to support the submission of the drilling and P&A EP, which will be provided to us in late January 2024, the second and third phases of the cultural values assessment will be working with community to document, share and educate the broader community on how they manage these cultural values and sensitivities, and is not about identifying further values. Beach and RP support this approach. RP will provide scope of works and proposal for Beach.			
E39533	13/11/2023	Email	Outgoing		Project update - general		N/A no response received Follow up email to check on the progress of the cultural values assessment proposal.	N/A no response received	
E39543	14/11/2023	Email	Incoming	Link to website		Requested further information RP she will send quote for phase 1 of the project. RP advised phase 1 will consist of a survey all community member's to identify cultural values and sensitivities for Beach to incorporate into the drilling and P&A EP. Phase 1 is designed to understand cultural values and sensitivities and will inform the Drilling and P&A EP. Phase 2 of the cultural values assessment will be to support the RP develop a plan for how they capture, record an, share and educate members on sea country and is not about identifying further values.	N/A no objections or claims made	N/A no objections or claims made	
E39544	14/11/2023	Email	Incoming	Link to website		RP provided quote for phase 1 of cultural values assessment.	N/A no objections or claims made	N/A no objections or claims made	
E39563	14/11/2023	Email	Incoming	Link to website		Acknowledgement of Beach email During consultation RP advised that they are unable to consult on cultural values and sensitivities due to lost knowledge and the history of dispossession. Beach agreed to support to capture and revitalisation of lost sea country knowledge by undertaking a culturlal values assessmnet. RP provided a proposal based on our conversation, for the cultural values assessment. The proposal outlines how the assessment will be phased in two phases, the first is to support the development of the EP and meet the requirements for consultation, Phase 2 of the cultural values assessment will be to support the RP develop a plan for how they capture, record an, share and educate members on sea country.	N/A no objections or claims made	N/A no objections or claims made	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33884	15/11/2023	Email	Outgoing	Link to website	Project update - timings	Acknowledgement of Beach email Advised RP that previous EP (seabed assessment) has been submitted. Advised that consultation for the next phase (Drilling and P&A) is continuing and dates that consultation will close. Provided RP link to Engage Beach consultation hub. Advised RP of dates and times for the upcoming OGV information webinars. Provided RP an overview of consultation as per regulations.	N/A no objections or claims made	N/A no objections or claims made	
E39529	20/11/2023	Email	Outgoing	Link to website		Acknowledgement of Beach email Advised RP that we have project manager approval to support the phase 1 of the cultural values assessment	N/A no objections or claims made	N/A no objections or claims made	
E34709	21/11/2023	Email	Incoming	Link to website	Project update - general	Advised other contacts at organisation RP confirmed receipt of email and advised it has been forwarded to relevant people within the organisation.	N/A no response received	N/A no response received	
E39534	21/11/2023	Email	Outgoing	Link to website		Acknowledgement of Beach email	N/A no objections or claims made	N/A no objections or claims made	
E39535	21/11/2023	Email	Outgoing	Link to website		Acknowledgement of Beach email	N/A no objections or claims made	N/A no objections or claims made	
E39540	23/11/2023	Email	Incoming			Requested further information RP advised the methodology for phase 1 of cultural values assessment as per our discussions. RP requested maps of operational and planning area to contextualise the offshore activity for community members.	N/A no objections or claims made	N/A no objections or claims made	
E39532	27/11/2023	Email	Outgoing			Requested further information Provided RP the map of the operational area, as per their request.	N/A no objections or claims made	N/A no objections or claims made	
E39539	28/11/2023	Email	Incoming			Requested further information RP is seeking feedback on the information being presented to community members during phase 1 of the cultural values assessment survey.	N/A no objections or claims made	N/A no objections or claims made	
E39336	9/01/2024	Email	Outgoing	Link to website	Project update - timings	N/A no response received Advised RP the seabed assessment EP has been accepted by NOPSEMA. Advised RP that consultation for drilling and P&A EP is continuing and will close on 18th January 2024. Advised of timings for when EP is submitted to NOSPEMA Will advise RP when EP is open for public comment so they can participate in that process Advised RP Otway offshore project EP was accepted by NOPSEMA Encouraged RP to participate in consultation Provided link to Engage Beach consultation hub	N/A no response received	N/A no response received	
E39538	10/01/2024	Email	Incoming			Acknowledgement of Beach email RP has advised they have received some responses from the community in regards to the cultural values of sea country. RP has confirmed they will have phase 1 of the CV assessment provided to us in time for EP submission.	N/A no objections or claims made	N/A no objections or claims made	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39537	19/01/2024	Email	Incoming	N/A		Acknowledgement of Beach email As per agreement and scope of works, RP provided phase 1 of cultural values and sensitivities to support the development of the drilling and P&A EP. Information contained within letter is confidential and not to be shared.	Relevant matter During development of previous EPs and this EP, Beach has reviewed RP publications and has consulted with RP to understand cultural values and sensitivities of Sea Country that have been documented in section 6.6.3. For consultation in relation to development of this EP Beach has provided information on the activities, potential impacts and control measures in this EP to senior representatives including their Environment Manager and Cultural Values Adviser. On 1 November 2023 RP advised that due to a history of dispossession, there was a gap in Sea Country knowledge and sought funding support from Beach. RP and Beach agreed on a phased approach that would enable RP to consult with its members, provide a report to Beach to assist in the development of this EP, and continue to further phases to continue working with their community to document, share and educate Bunurong people. RP has provided a report on cultural values to Beach and has requested that it includes sensitive matters and should remain confidential. Beach advised RP that this EP would be submitted for a completeness check by NOPSEMA, that the EP would be published for public comment and Beach would advise them so that they can participate in that process if they wish. Throughout the consultations, no specific concerns have been raised.	Beach has provided sufficient information and demonstrated reasonable efforts to consult with RP. In section 6.6.3 of this EP, Beach has documented the cultural values and sensitivities learned through consultation with RP, from the cultural values report prepared by the RP, from specialist archaeological consulting firm and literature reviews. Consultation for the development of this EP has been completed. Should new information be received from the RP on cultural values applicable to the activities in this EP, it will be assessed and where Beach considers appropriate, Beach will apply its Management of Change Standard (section 8.3.4). Beach will be undertaking a Seabed Survey that includes assessment of cultural heritage and cultural landscapes within the proposed Operational Areas and will continue to consult for the implementation of this EP in accordance with control measures.	Existing measures in EP address potential impacts Control Measure 03: Consultation for Implementation of EP Control Measure 05: Seabed Survey

Indigenous Entity ID: 4194404 - Burrandies Aboriginal Corporation

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39602	5/06/2023	Email	Outgoing			Email outgoing. Advised RP of upcoming OGV activities, which include seabed assessment (non seismic) and a drilling campaign. Provided dates for the upcoming campaign. Advised RP of the purpose for consultation under the regulations.	N/A no objections or claims made	N/A no objections or claims made	
E35005	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35006	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35007	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39338	9/01/2024	Email	Outgoing	Link to website	Project update - timings	N/A no response received	N/A no response received	N/A no response received	
E39339	9/01/2024	Email	Outgoing	Link to website	Project update - timings	N/A no response received	N/A no response received	N/A no response received	
E39340	9/01/2024	Email	Outgoing	Link to website	Project update - timings	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Indigenous Entity ID: 4194745 - Circular Head Aboriginal Corporation

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E42534	3/10/2023	Email	Outgoing	Link to website	Project introduction	N/A no response received Informing RP of upcoming webinar.	N/A no response received	N/A no response received	
E42535	11/10/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received Informing RP of upcoming webinar.	N/A no response received	N/A no response received	
E33920	15/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received Advised RP that previous EP (seabed assessment) has been submitted. Advised that consultation for the next phase (Drilling and P&A) is continuing and dates that consultation will close. Provided RP link to Engage Beach consultation hub. Advised RP of dates and times for the upcoming OGV information webinars. Provided RP an overview of consultation as per regulations.	N/A no response received	N/A no response received	
E34642	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received Advised RP that previous EP (seabed assessment) has been submitted. Advised that consultation for the next phase (Drilling and P&A) is continuing and dates that consultation will close. Provided RP link to Engage Beach consultation hub. Advised RP of dates and times for the upcoming OGV information webinars. Provided RP an overview of consultation as per regulations.	N/A no response received	N/A no response received	
E37323	4/12/2023	Phone	Outgoing	N/A	Project update - general	Called RP, no answer, left voicemail and provided them contact number.	N/A no response received	N/A no response received	
E39367	9/01/2024	Email	Outgoing	Link to website	Project update - timings	N/A no response received Advised RP the seabed assessment EP has been accepted by NOPSEMA. Advised RP that consultation for drilling and P&A EP is continuing and will close on 18th January 2024. Advised of timings for when EP is submitted to NOSPEMA Will advise RP when EP is open for public comment so they can participate in that process Advised RP Otway offshore project EP was accepted by NOPSEMA Encouraged RP to participate in consultation Provided link to Engage Beach consultation hub	N/A no response received	N/A no response received	

Indigenous Entity ID: 1533 - Eastern Maar Aboriginal Corporation

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36361	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received Email outgoing. Advised RP of upcoming OGV activities, which include seabed assessment (non seismic) and a drilling campaign. Provided dates for the upcoming campaign. Advised RP of the purpose for consultation under the regulations. Provided RP information sheet of upcoming OGV activities.	N/A no response received	N/A no response received	
E35124	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35125	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35126	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35127	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35128	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33890	15/11/2023	Email	Outgoing	Link to website	Project update - general	Advised RP that previous EP (seabed assessment) has been submitted. Advised that consultation for the next phase (Drilling and P&A) is continuing and dates that consultation will close. Provided RP link to Engage Beach consultation hub. Advised RP of dates and times for the upcoming OGV information webinars. Provided RP an overview of consultation as per regulations.	N/A no objections or claims made	N/A no objections or claims made	
E33960	20/11/2023	Email	Outgoing	Link to website	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34635	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34636	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34637	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34638	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34639	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34190	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39501	24/11/2023	Email	Incoming	N/A		RP is seeking an independent assessment of draft EP to inform their understanding of potential impacts to the environment, cultural heritage and traditions and customs.	Relevant matter Beach provided similar opportunity for Beach onshore EP and is generally supportive of this approach subject to clarifications.	Beach sought further discussions with RP to clarify consultation expectations given Beach has been consulting for some time, and sought clarification of the nature of the independent assessment they were seeking.	
E39502	28/11/2023	Email	Outgoing	N/A	Project update - general	Beach responded to RP's email proposal sent on 24th Nov 2023. Requested an opportunity to meet and discuss further. Requested this meeting be held prior to the scheduled engagement committee meeting on the 13th December 2023.		Beach is requesting meeting with RP to discuss proposal.	
E39503	28/11/2023	Email	Incoming	N/A		RP accepted Beach request to discuss proposal in more detail, and agrees the meeting should to be held prior to meeting on the 13th of December.	Relevant matter		
E39505	28/11/2023	Email	Outgoing			Requested consultation Proposed meeting time to discuss RP proposal in more detail.	N/A no objections or claims made	N/A no objections or claims made	
E39511	29/11/2023	Meeting - online		N/A		Beach and RP met to discuss the proposal to engage an independent review of Beach's draft drilling and P&A EP. Beach asked RP to describe the proposal and its intent. RP advised us the intent is to seek an independent review of Beach's draft EP, to understand how impacts are mitigated. Beach advised RP that we do not provide	Relevant matter Beach has previously agreed to a request from EMAC for an independent analysis and opinion of the marine impacts of a Beach project in Victorian state waters. Notwithstanding the regulator's role in assessing EPs and the commensurate expertise required to undertake such assessments, Beach supported EMAC's request in the context of building trust in the	Beach discussed with EMAC leadership the timing of the independent review and it was mutually agreed that the review would be funded by Beach and be undertaken during the public comment period, which commences after NOPSEMA has checked the EP for completeness.	Should matters arise from EMAC's independent assessment, they will be assessed and managed in accordance with the requirements for responding to public comments, as per (OPPSG(E) Section 30(3)).

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						draft EP's, that once completed we submit to NOPSEMA to undertake a completeness check, following that the EP will go out for public comment, however Beach advised the RP that this does not replace the requirement for consultation in the development of the EP and requested to meet this requirement Beach facilitate a hybrid (online and in person) community information session. RP agreed and agreed for information session to take place prior to scheduled meeting on the 13th of December. Beach discussed the independent review with RP, and asked whether this report could be made available to other First Nations groups who may be interested, RP agreed with this approach. RP advised they will send a proposal for an independent review.	transparency of regulatory approvals documents it prepares and submits.		
E39504	1/12/2023	Email	Outgoing	Info sheet		Requested further information As per our meeting with RP on 29th November 2023, Beach provided RP the requested information (and also attached Beach info sheets) to allow the RP to send to the broader community. To support the proposed information session, Beach also resent the OGV drilling and plug and abandonment information sheets and maps of the activity and planning areas, to the RP. As per discussion, Beach provided RP an overview of the requirement for Gas in Victoria and the purpose of consultation. Beach advised RP, that as per our conversation, Beach will book an information session, for online and in person, for December 13th 2023.	N/A no objections or claims made	N/A no objections or claims made	
E39506	4/12/2023	Email	Outgoing		Project update - general	Advised RP of venue details for the upcoming community information session as per discussion on 29th November 2023.	N/A no objections or claims made	N/A no objections or claims made	
E39507	8/12/2023	Email	Outgoing			Requested consultation RP advised that they are now unable to commit to the OGV drilling and P&A community information session scheduled for the 13th December due to competing priorities. Proposed information session when office reopens on the 8th January 2024. Bech confirmed we are able to facilitate a information session on the week of the 8th of January 2024, and requested further information to allow us to book the venue and organise attendees.	N/A no objections or claims made	N/A no objections or claims made	
E39500	13/12/2023	Meeting - in person		Link to website	Project update - general	Requested consultation Meeting in person on the 13th Dec 2023 with RP engagement committee. RP attendees include Chair person, Healthy Country manager, Business development manager and a community representative. Meeting went from 9am to 2pm, with approximately 2 hours allocated to discussion of OGV drilling and P&A activity. Beach provided an overview of the	Relevant matter Beach understands general concerns about sea country and interests in measures undertaken for protection of sea country, however specific concerns about the impacts of the EP have not been raised.	Beach understands the RP cultural values and sensitivities and they have been documented in the EP.	

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						regulatory framework, the purpose of consultation in developing our EP's. Beach discussed that the activity involves up to 7 exploration and appraisal wells and plug and abandonment in the area (map / location shown). Discussed P&A activities using reference material and examples. Beach provided a demonstration of Engage Beach, how it works and opportunities for consultation. Whilst navigating Engage Beach, Beach reps showed maps of activity and planning areas. and discussed oil spill response modelling, advised RP that the product is gas condensate not oil and showed an example of condensate. RP representatives asked how long the infrastructure has been in place and asked how we ensure that pipeline integrity is maintained. Beach responded with a demonstration of the pipelines explaining the integrity and how they are designed. Beach explained the the infrastructure has been in place for 15 years and that we maintain pipelines using monitoring equipment including pipeline integrity inspections and monitor pressure using information sent back to control panel. No formal objections or claims were received and no concerns about cultural values or sensitivities were raised.			
E39508	22/12/2023	Email	Outgoing	Link to website	Project update - general	Beach sent email summarising meeting held on the 29th of November to discuss the proposal put forwards from the RP to seek an independent review of the draft EP. Advised that as per our discussions, in accordance with regulations, Beach do not release draft EP's until the completeness check has been completed by NOPSEMA. Beach advised RP, as per our conversation, that Beach supports an independent review during the open for comment phase. Beach requested, in light of cancelled information session, for RP to confirm new date for re-scheduling the information session to allow community members enough notice to attend. Advised RP, that during meeting with RP's corporation, on the 13th of December, Beach discussed OGV, shared with attendees attached slides (attached) reviewed relevant maps and demonstrated examples of flowlines and engineering. Beach also provided the attendees an update on Engage Beach consultation hub and ran them through how the hub works and where there's opportunity to consult with Beach on activities. Beach advised RP that Beach received positive feedback feedback on the Engage Beach hub and that no concerns or questions were raised regarding the drilling and P&A activities. Advised RP, as per meeting in Nov 2023, that following the proposed meeting in January, we will provide them with a list of	Relevant matter		

Engagement Summary
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Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						cultural values and sensitivities that we have learnt to date, prior to submitting our EP.			
E39509	8/01/2024	Email	Outgoing	Link to website		Requested consultation Beach followed up on proposed community information session dates for January 2024. Requested RP provide a preferred date.	N/A no objections or claims made	N/A no objections or claims made	
E39510	10/01/2024	Email	Outgoing			In response to previous conversations, Beach agreed to fund an independent review of the draft environmental plan when it opens for public comment. Advised RP that Beach has raised the PO for this work to be conducted. Provided RP with relevant dates, to support the engagement of an independent consultant to review draft EP. Advised RP, as per discussions, that any enquiries submitted during open for comment period go through NOPSEMA, however advised RP that Beach is always open to being contacted directly. Advised RP that Beach will send a reminder when draft EP is open for comment.	N/A no objections or claims made	N/A no objections or claims made	
E39403	11/01/2024	Email	Outgoing	Link to website	Project update - timings	N/A no response received Advised RP the seabed assessment EP has been accepted by NOPSEMA. Advised RP that consultation for drilling and P&A EP is continuing and will close on 18th January 2024. Advised of timings for when EP is submitted to NOSPEMA Will advise RP when EP is open for public comment so they can participate in that process Advised RP Otway offshore project EP was accepted by NOPSEMA Encouraged RP to participate in consultation Provided link to Engage Beach consultation hub	N/A no objections or claims made	N/A no objections or claims made	
E39682	12/01/2024	SMS	Outgoing	N/A	Project update - timings	N/A message outgoing.	N/A no objections or claims made	N/A no objections or claims made	
E39693	1/02/2024	Email	Outgoing	N/A	Project update - timings	N/A no response received Follow up email to RP to understand how they are progressing with sourcing an independent specialist. Provided RP with an update on EP submission time frames.	Relevant matter During development of previous EPs and this EP, Beach has reviewed RP publications and has consulted with RP to understand cultural values and sensitivities of Sea Country that have been documented in section 6.6.3. For consultation in relation to development of this EP Beach has provided information on the activities, potential impacts and control measures in this EP to multiple representatives including Executive, Managers, and cultural heritage roles. On 24 November 2023, RP requested Beach fund an independent review of the EP. On 28 November 2023, Beach and RP agreed on approach and timings of the requested independent review and Beach offered additional engagement with RP members. Beach met with the EMAC/Beach Consultative Committee on 13 December	Beach has provided sufficient information and demonstrated reasonable efforts to consult with RP. In section 6.6.3 of this EP, Beach has documented the cultural values and sensitivities learned through consultation with RP and from RP publications, from specialist archaeological consulting firm and literature reviews. Consultation for the development of this EP has been completed. Beach has agreed to fund RP undertaking an independent expert review of the EP during the public comment period. Beach engages in ongoing consolation for implementation of this EP. Should new information be received from the RP on cultural values applicable to the activities in this EP, it will be assessed and where Beach considers appropriate, Beach will apply its Management of Change Standard (section 8.3.4).	Existing measures in EP address potential impacts 6. Description of Environment, 6.6 First Nations describes RPs cultural values and sensitivities. 7.15 Environmental Performance Outcomes, Standards and Measurement Criteria shows overall environment protection measures and specifically: - CM03 Consultation for Implementation of the EP; - CM05 Seabed Survey; - CM08 Whale Management Procedure; - CM13 Beach Offshore Oil Pollution Emergency Plan.

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
							2023, the agenda included a detailed discussion about the activities in this EP and no specific concerns were raised.	Beach will be undertaking a Seabed Survey that includes assessment of cultural heritage and cultural landscapes within the proposed Operational Areas and will continue to consult for the implementation of this EP in accordance with control measures.	

Indigenous Entity ID: 4194756 - Eden Local Aboriginal Land Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33946	15/11/2023	Phone	Outgoing	Link to website	Project introduction	Advised other contacts at organisation Beach discussed OGV drilling and P&A with RP. Requested the contact details for the most culturally appropriate person to speak with, RP advised me of contact details for Chair, who is a traditional custodian of sea country. RP advised Beach that orcas and humpback whales hold great significance for Yuin people.	N/A no objections or claims made	N/A no objections or claims made	
E33926	16/11/2023	Email	Outgoing	Link to website	Project introduction	N/A no response received Beach contacted RP to introduce ourselves and the project. Discussed with RP the OGV project, RP asked why we are contacting them as they are so far, Beach explained to the RP the reason for consultation is they are identified as being a relevant person within the extended planning area. Explained to RP what the planning area is and advised they can find out more on the Engage Beach consultation hub. Advised RP they can find out the emergency response information on the hub also. Beach advised RP of the upcoming OGV drilling and P&A information webinars, and advised if they are interested they can register via the details in the email.	N/A no objections or claims made	N/A no objections or claims made	
E34193	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received Sent an email to RP reminding them of upcoming OGV drilling and P&A webinars, including guidance on how to register to attend.	N/A no response received	N/A no response received	
E39381	10/01/2024	Email	Outgoing	Link to website	Project update - timings	N/A no response received Advised RP the seabed assessment EP has been accepted by NOPSEMA. Advised RP that consultation for drilling and P&A EP is continuing and will close on 18th January 2024. Advised of timings for when EP is submitted to NOSPEMA Will advise RP when EP is open for public comment so they can participate in that process Advised RP Otway offshore project EP was accepted by NOPSEMA Encouraged RP to participate in consultation Provided link to Engage Beach consultation hub	N/A no objections or claims made	N/A no objections or claims made	

Indigenous Entity ID: 1542 - First Nations Legal & Research Services Ltd

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35142	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35143	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35144	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33892	15/11/2023	Email	Outgoing	Link to website	Project update - timings	N/A no response received	N/A no objections or claims made	N/A no objections or claims made	
E33893	15/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34640	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39344	9/01/2024	Email	Outgoing	Link to website	Project update - timings	N/A no response received Advised RP the seabed assessment EP has been accepted by NOPSEMA. Advised RP that consultation for drilling and P&A EP is continuing and will close on 18th January 2024. Advised of timings for when EP is submitted to NOSPEMA Will advise RP when EP is open for public comment so they can participate in that process Advised RP Otway offshore project EP was accepted by NOPSEMA Encouraged RP to participate in consultation Provided link to Engage Beach consultation hub	N/A no response received	N/A no response received	

Indigenous Entity ID: 4194748 - First Peoples Assembly of Victoria

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33923	16/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received Advised RP that previous EP (seabed assessment) has been submitted. Advised that consultation for the next phase (Drilling and P&A) is continuing and dates that consultation will close. Provided RP link to Engage Beach consultation hub. Advised RP of dates and times for the upcoming OGV information webinars. Provided RP an overview of consultation as per regulations.	N/A no response received	N/A no response received	
E34643	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received Beach provided RP a reminder of the upcoming Drilling and P&A webinars, along with a description of how to register for a session. Beach also provided RP a link to Engage beach consultation hub.	N/A no response received	N/A no response received	
E39361	9/01/2024	Email	Outgoing	Link to website	Project update - timings	N/A no response received Advised RP the seabed assessment EP has been accepted by NOPSEMA. Advised RP that consultation for drilling and P&A EP is continuing and will close on 18th January 2024. Advised of timings for when EP is submitted to NOSPEMA Will advise RP when EP is open for public comment so they can participate in that process Advised RP Otway offshore project EP was accepted by NOPSEMA Encouraged RP to participate in consultation	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						Provided link to Engage Beach consultation hub			
Indigenous Entity ID: 4194614 - Flinders Island Aboriginal Association Inc									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39598	2/06/2023	Email	Outgoing	Info sheet	Project update - general	Email outgoing. Advised RP of upcoming OGV activities, which include seabed assessment (non seismic) and a drilling campaign. Provided dates for the upcoming campaign. Advised RP of the purpose for consultation under the regulations.	N/A no objections or claims made	N/A no response received	
E35161	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35162	14/07/2023	Email	Outgoing	Link to website	Project update - general	Sent reminder to RP for upcoming OGV community information sessions. Provided RP with a link to Engage Beach Beach Energy's Consultation hub.	N/A no response received	N/A no response received	
E33901	15/11/2023	Email	Outgoing	Link to website	Project update - general		N/A no objections or claims made	N/A no objections or claims made	
E33902	15/11/2023	Email	Outgoing	Link to website	Project update - general		N/A no objections or claims made	N/A no objections or claims made	
E34641	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no objections or claims made	N/A no objections or claims made	
E39376	9/01/2024	Email	Outgoing	Link to website	Project update - timings	N/A no response received	N/A no objections or claims made	N/A no objections or claims made	
E39377	9/01/2024	Email	Outgoing	Link to website	Project update - timings	N/A no response received Advised RP the seabed assessment EP has been accepted by NOPSEMA. Advised RP that consultation for drilling and P&A EP is continuing and will close on 18th January 2024. Advised of timings for when EP is submitted to NOSPEMA Will advise RP when EP is open for public comment so they can participate in that process Advised RP Otway offshore project EP was accepted by NOPSEMA Encouraged RP to participate in consultation Provided link to Engage Beach consultation hub	N/A no response received	N/A no response received	
Indigenous Entity ID: 4194613 - Gunaikurnai Land and Waters Aboriginal Corporation									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39580	30/05/2023	Email	Outgoing			Email outgoing. Advised RP of upcoming OGV activities, which include seabed assessment (non seismic) and a drilling campaign. Provided dates for the upcoming campaign. Advised RP of the purpose for consultation under the regulations.	N/A no objections or claims made	N/A no objections or claims made	
E35193	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35194	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35195	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35196	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39620	6/09/2023	Meeting - in person		N/A	Project update - general	N/A In person meeting Invited by RP manager to attend a boat cruise down Lakes Entrance to learn about Sea Country. Learnt about the importance of the Borun (pelican), bream, and seals as well as the cultural significance of the barrier dune and lakes to Gunaikurnai peoples. RP shared with me the importance about the bottlenosed dolphin that is only found in the lakes. Had the opportunity to meet other members of Gunaikurnai and learn about what is important to the community.	N/A no objections or claims made	N/A no objections or claims made	
E39621	7/09/2023	Meeting - in person			Project update - general	N/A as meeting in person. Met with RP to to discuss our offshore activities. Thanked RP for the invite on the boat to visit Sea Country. Beach discussed our offshore gas project. RP shared the understanding that gas is still required and that the transition to renewables is a transition and not something that can be done overnight. RP did not identify any specific concerns regarding our broader offshore activities and that the priority for them is to protect the lakes and barrier dune from coastal erosion. Advised RP that there is no new infrastructure required on shore and the distance the offshore infrastructure is and it is unlikely to cause coastal erosion. Beach understand through consultation that bringing fire back into the landscape, to manage Country right ways, is a big focus for their community. Beach discussed the planning area and in the extremely unlikely event of a worst case (spill) scenario) our emergency response requirements. RP mentioned that in the unlikely event of an emergency, RP would like to see sea country rangers equipped to respond, where appropriate, and have expressed an interested in the AMOSC oil spill response training. RP shared that with the large volume of consultation requests and project related email's, their preference is to receive these updates in the form of newsletters with more imagery and less words. RP mentioned that for future consultation for OGV, community sessions with Managers and subject matters experts would be beneficial as it provides community an opportunity to ask questions and understand what we are doing.	N/A no objections or claims made	N/A no objections or claims made	
E33900	15/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no objections or claims made	N/A no objections or claims made	

Engagement Summary
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Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						Advised RP that previous EP (seabed assessment) has been submitted. Advised that consultation for the next phase (Drilling and P&A) is continuing and dates that consultation will close. Provided RP link to Engage Beach consultation hub. Advised RP of dates and times for the upcoming OGV information webinars. Provided RP an overview of consultation as per regulations.			
E33940	16/11/2023	Email	Incoming	Link to website	Project update - timings	Requested further information RP expressed an interest in attending one of the upcoming dfrilling and P&A webinars.	N/A no objections or claims made	N/A no objections or claims made	
E33941	16/11/2023	Email	Outgoing	Link to website	Project update - timings	Acknowledgement of Beach email Beach advised RP that as soon as the webinar links are available Beach will send them through.	N/A no objections or claims made	N/A no objections or claims made	
E33953	17/11/2023	Email	Outgoing	Link to website	Project update - general	Acknowledgement of Beach email RP has registered their attendance at the upcoming information sessions. Beach provided the link to the additional information webinars, in case they are interested in attending any of those also.	N/A no objections or claims made	N/A no objections or claims made	
E33961	20/11/2023	Email	Incoming	Link to website	Project update - general	Requested further information RP advised Beach they have registered for upcoming OGV drilling and P&A information webinars. RP asked whether a recording will be circulated.	N/A no objections or claims made	N/A no objections or claims made	
E33972	20/11/2023	Email	Outgoing	Link to website	Project introduction	Acknowledgement of Beach email Advised RP that we are unable to film upcoming webinar's however can provide them with the presentation used.	N/A no objections or claims made	N/A no objections or claims made	
E34644	21/11/2023	Email	Outgoing	Link to website	Project update - general	Acknowledgement of Beach email Sent RP email reminding them of the upcoming webinars for the OGV drilling and P&A EP. Provided RP details of how to register and also provided the link to Engage Beach consultation hub.	N/A no response received	N/A no response received	
E34715	21/11/2023	Email	Incoming	Link to website	Project update - general	Acknowledgement of Beach email RP advised they will endeavour to attend upcoming webinar, however in the event they're unable to attend are Beach able to send the power-point.	N/A no objections or claims made	N/A no response received	
E38325	22/11/2023	Email	Outgoing	Link to website	Project update - general	Requested consultation RP advised they were unable to attend webinar, Beach responded by offering additional information sessions the following week, or alternatively Beach can facilitate a one on one information session with the RP. Will await their response.	N/A no objections or claims made	N/A no objections or claims made	
E39447	22/11/2023	Email	Incoming	Link to website		Requested consultation RP advised that they will be unable to attend the upcoming information sessions, as planned, however advised they are very interested in learning more about the project and requested an information session targeted for them.	N/A no objections or claims made	N/A no objections or claims made	
E39446	24/11/2023	Email	Incoming			Requested consultation RP advised that they like the idea of an additional information session	N/A no objections or claims made	N/A no objections or claims made	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						accommodated for them to attend.			
E38326	28/11/2023	Email	Outgoing	N/A	Project update - general	Requested consultation Beach advised RP that we are willing to accommodate a one on one information session for the drilling and P&A EP. Asked RP to propose some possible dates so we can confirm our Beach attendees.	N/A no objections or claims made	N/A no objections or claims made	
E39445	29/11/2023	Email	Incoming			Requested consultation RP will advise of dates for meeting.	N/A no objections or claims made	N/A no objections or claims made	
E39443	12/12/2023	Email	Incoming	N/A	Project introduction	Requested consultation RP was unable to attend scheduled information sessions and requested an additional session with their internal stakeholders. Beach agreed. RP advised that they will forward information session invite to other internal internal stakeholders.	N/A no objections or claims made	N/A no objections or claims made	
E39444	12/12/2023	Email	Incoming		Project update - general	Requested consultation RP requested an information session on 15th Dec 2023. RP advised the attendees at the session.	N/A no objections or claims made	N/A no objections or claims made	
E39418	14/12/2023	Email	Outgoing	N/A	Project introduction	Requested consultation Beach responded to RP's request for consultation. Beach confirmed the attendees at the infomration session and requested RP invite relevant RP's from the corporation to attend.	N/A no objections or claims made	N/A no objections or claims made	
E39448	14/12/2023	Email	Incoming			Acknowledgement of Beach email RP accepted meeting request. Invited internal relevant stakeholders.	N/A no objections or claims made	N/A no objections or claims made	
E39417	15/12/2023	Email	Outgoing	Info sheet	Project update - general	Provided RP with attachment of presentation shared during meeting. Confirmed Beach will update the OPEP with contact details provided. Acknowledged RP interest in emergency response and advised Beach are open to future conversations about this.	Relevant matter Beach is happy to meet this request from Gunaikurnai	N/A no objections or claims made	Beach has added RP's emergency contact details to OPEP to notify in the event of an emergency.
E39449	15/12/2023	Email	Incoming			Requested further information Following on from meeting, as per agreed approach, RP advised of contact details and timing of notification, in the event of an emergency. RP expressed interest in being involved with emergency responses. Advised that IPA Sea Country plan is couple of years away but will require us to update EP based on any new relevant information. RP expressed interest in submerged cultural landscapes and requested option to access data from any seabed assessments and seismic surveys.	Relevant matter Beach to update OPEP with contact details as per agreement, to notify RP of an incident. Beach provided RP with contact details for emergency response training		Existing measures in EP address potential impacts Updated OPEP to reflect contact details and notification time frames, for in the event of emergency.
E39455	15/12/2023	Meeting - online		Link to website	Project update - general	Requested further information Discussed with RP the OGV drilling and P&A activities. Shared presentation attached. RP acknowledged the operational areas as Eastern Maar and Bunurong sea country. RP would like to be contacted in the event of an offshore emergency - Beach advised that we can add contact details to OPEP to contact in event of emergency. RP asked what Cultural values have	Relevant matter Beach to update OPEP with emergency notification contacts	Beach advised RP that we will update the OPEP contact details as per their request.	Existing measures in EP address potential impacts

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						previously been shared by other RP representatives.Beach advised the sensitivities shared in previous consultation, RP agreed with these sensitivities and had no additional values and sensitivities to add. RP is interested in any data of of submerged cultural landscape to build up a database - Beach advised that, where appropriate, we can share any sub surface data to help them build their database.			
E39450	18/12/2023	Email	Outgoing	Link to website	Project update - general	Requested further information Beach advised RP that we will update the OPEP following their request to be notified in the event of an emergency.	Relevant matter Beach to update OPEP to reflect RP's request to be notified in the event of an emergency.	Advised RP we will update OPEP to include contact details from the Corporation, in the event of an emergency.	Existing measures in EP address potential impacts Beach to update OPEP to reflect RP's request to be notified in the event of an emergency.
E39451	18/12/2023	Email	Outgoing	Link to website		Acknowledgement of Beach email RP confirmed the timeframes of notification, in the event of an emergency. RP thanked Beach for links to training courses.	N/A no objections or claims made	N/A no objections or claims made	
E39415	9/01/2024	Email	Outgoing	Link to website	Project update - timings	N/A no response received Advised RP the seabed assessment EP has been accepted by NOPSEMA. Advised RP that consultation for drilling and P&A EP is continuing and will close on 18th January 2024. Advised of timings for when EP is submitted to NOSPEMA Will advise RP when EP is open for public comment so they can participate in that process Advised RP Otway offshore project EP was accepted by NOPSEMA Encouraged RP to participate in consultation Provided link to Engage Beach consultation hub	N/A no response received	N/A no response received	
E39416	9/01/2024	Email	Outgoing	Link to website	Project update - timings	N/A no response received Advised RP the seabed assessment EP has been accepted by NOPSEMA. Advised RP that consultation for drilling and P&A EP is continuing and will close on 18th January 2024. Advised of timings for when EP is submitted to NOSPEMA. Will advise RP when EP is open for public comment so they can participate in that process. Advised RP Otway offshore project EP was accepted by NOPSEMA. Encouraged RP to participate in consultation. Provided link to Engage Beach consultation hub.	Relevant matter For consultation in relation to development of this EP Beach has provided information on the activities, potential impacts and control measures in this EP to multiple senior RP representatives.Beach has reviewed RP publications and has consulted with RP to understand cultural values and sensitivities of Sea Country that have been documented in section 6.6.3. On 7 September 2023 Beach's First Nations Engagement Manager met with RP for an on-Country visit during which RP shared their Sea Country values and primary concerns regarding coastal erosion. RP inquired about spill management risks and response measures and Beach explained the Planning area, low risk and OPEP. Beach advised RP that this EP would be submitted for a completeness check by NOPSEMA, that the EP would be published for public comment and Beach would advise them so that they can participate in that process if they wish. Throughout the consultations, no specific concerns have	Beach has provided sufficient information and demonstrated reasonable efforts to consult with RP. In section 6.6.3 of this EP, Beach has documented the cultural values and sensitivities learned through consultation with RP, from the cultural values report prepared by the RP, from specialist archaeological consulting firm and literature reviews. Consultation for the development of this EP has been completed. Should new information be received from the RP on cultural values applicable to the activities in this EP, it will be assessed and where Beach considers appropriate, Beach will apply its Management of Change Standard (section 8.3.4).	Existing measures in EP address potential impacts Control Measure 03: Consultation for Implementation of EP Beach has updated its OPEP to reflect RP's request to be notified in an emergency.

Engagement Summary
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Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
							been raised.		
Indigenous Entity ID: 4194729 - Gunditj Mirring Traditional Owners Aboriginal Corporation									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39584	1/06/2023	Email	Outgoing	Info sheet	Project update - general	Email outgoing. Advised RP of upcoming OGV activities, which include seabed assessment (non seismic) and a drilling campaign. Provided dates for the upcoming campaign. Advised RP of the purpose for consultation under the regulations.	N/A no objections or claims made	N/A no objections or claims made	
E39585	1/06/2023	Email	Outgoing	Info sheet	Project update - general	Email outgoing. Advised RP of upcoming OGV activities, which include seabed assessment (non seismic) and a drilling campaign. Provided dates for the upcoming campaign. Advised RP of the purpose for consultation under the regulations.	N/A no objections or claims made	N/A no objections or claims made	
E35197	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35198	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35199	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35200	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35201	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35202	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39513	15/11/2023	Email	Outgoing	Link to website	Project update - timings	N/A no response received Advised RP that previous EP (seabed assessment) has been submitted. Advised that consultation for the next phase (Drilling and P&A) is continuing and dates that consultation will close. Provided RP link to Engage Beach consultation hub. Advised RP of dates and times for the upcoming OGV information webinars. Provided RP an overview of consultation as per regulations.	N/A no objections or claims made	N/A no objections or claims made	
E34708	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34710	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34711	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34712	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34713	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34714	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

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Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39514	8/12/2023	Email	Outgoing	Link to website	Project update - timings	Acknowledgement of Beach email Beach emailed RP advising of recent online information webinars for the drilling and P&A activities. Confirmed with RP that we are currently having a discussion about a broader offshore activities (including OGV and other offshore projects) with proponents, however requested RP to advise whether they would like an information session specifically for the drilling and P&A activity.	N/A no objections or claims made	N/A no objections or claims made	
E39520	9/12/2023	Email	Incoming	N/A		Requested consultation RP advised that due to increased requests from offshore proponents RP corporation is experiencing significant pressure on resources. RP advised that for efficiency and to reduce adding additional strain on resources, RP corporation is suggesting an information session attended by all offshore proponents, to meet with the RP community and discuss all our offshore activities. This session will be supported by First Peoples State Relations to facilitate the session. RP advised standard meeting fees will apply and to secure a timeslot please reply to their email expressing interest by Friday 19th January 2024.	N/A no objections or claims made No matters were raised in relation to adverse impacts of the EP activities. Beach will attend the industry wide session requested by the RP to discuss Beach's breadth of offshore activities.	N/A no objections or claims made	
E39515	15/12/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received Beach responded to RP's invitation to attend joint proponent information session. Beach advised that as per our email on 15th November, Beach will summarise all consultation undertaken until mid January 2024, Beach advised RP we will then be submitting our EP to NOPSEMA at the end of January. Beach advised RP that NOPSEMA will undertake a completeness check and if determined to be complete, the EP will be published for open comment and public consultation, advising RP that they can participate in that if they would like. Beach advised RP that that we have thoroughly reviewed their publicly available sea country plans and research, and using the information we have learnt through that as well as previous consultation, we will identify those values and sensitivities in our EP and provide a response to how they will be mitigated, advising RP that they can review this during the public comment stage. Therefore consultation for the purpose of developing this EP is complete. Beach provided RP with link to Engage Beach consultation hub.	N/A no objections or claims made	N/A no objections or claims made	
E39374	9/01/2024	Email	Outgoing	Link to website	Project update - timings	N/A no response received Advised RP the seabed assessment EP has been accepted by NOPSEMA. Advised RP that consultation for drilling and P&A EP is continuing and will close on 18th January 2024. Advised of timings for when EP is submitted to NOSPEMA Will advise RP when EP is open for public comment so they can participate in that process Advised RP Otway offshore project EP was	N/A no response received	N/A no response received	

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						accepted by NOPSEMA Encouraged RP to participate in consultation Provided link to Engage Beach consultation hub			
E39516	11/01/2024	Email	Outgoing			N/A no response received Sent RP an email requesting any additional details for upcoming joint proponent session on the 17th Feb 2024.	N/A no objections or claims made	N/A no objections or claims made	
E39517	11/01/2024	Email	Outgoing	N/A	Project update - general	N/A no response received Thanked RP for the details of the upcoming information session on the 17th of Feb 2024. Advised the RP that understanding what questions the community may ask will be helpful in determining we bring the right people to the session and ensuring that we present information that reflects their interests. Requested details on payment to ensure we can get required internal approvals.	N/A no objections or claims made	N/A no objections or claims made	
E39519	11/01/2024	Email	Incoming	N/A	Project update - general	Acknowledgement of Beach email RP advised they are still working on the finer details for the broader offshore information session. RP advised location of the event, but advised the finer details are still being finalised. RP advised they will structure some questions to assist with developing the right information for the session. RP also advised there will be fees on which they will advise shortly.	N/A no objections or claims made	N/A no objections or claims made	
E39518	18/01/2024	Email	Incoming	N/A		RP emailed to confirm the details for the upcoming information session with the community, including location, timeslots and proposed questions they would like Beach to discuss.	Relevant matter During development of previous EPs and this EP, Beach has reviewed RP publications and has consulted with RP to understand cultural values and sensitivities of Sea Country that have been documented in section 6.6.3. For consultation in relation to development of this EP Beach has provided information on the activities, potential impacts and control measures in this EP to multiple representatives including Executive, Managers, and cultural heritage roles. On 9 December 2023 RP suggested that to manage the demand on their resources, an offshore industry-wide information session with RP to understand the range of offshore activities that Beach (and others) are planning. Beach supported this approach and will participate in RPs event. Beach advised that through consultation already undertaken we have understood RP Sea Country values, that this EP would be submitted for a completeness check by NOPSEMA, that the EP would be published for public comment and Beach would advise them so that they can participate in that process if they wish. Throughout the consultations, no specific concerns have been raised.	Beach has provided sufficient information and demonstrated reasonable efforts to consult with RP. In section 6.6.3 of this EP, Beach has documented the cultural values and sensitivities learned through consultation with RP and from RP publications, from specialist archaeological consulting firm and literature reviews. Consultation for the development of this EP has been completed. Should new information be received from the RP on cultural values applicable to the activities in this EP, it will be assessed and where Beach considers appropriate, Beach will apply its Management of Change Standard (section 8.3.4).	Existing measures in EP address potential impacts
E40156	17/02/2024	Meeting - in person		Info sheet		Key questions or matters raised at the meeting included:	Relevant matter Beach has assessed the broad concerns raised and potential impacts have been	Beach attended industry wide forum arranged by RP for the members to meet	Existing measures in EP address potential impacts

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						- status of Beach's drilling and P&A EP; - management of cumulative impacts; - how wells are P&A, why have the wells been left so long; - how Beach 'heals country'; - no financial benefits for the RPs from the oil and gas industry's activities; complexity of EPs.	assessed as ALARP and acceptable given control measures in the EP.	with Beach and other title holders with activities in the Otway Basin. Recognising likely different information needs, Beach prepared a tailored presentation to show the activities by way of diagrams and pictures, prepared storey boards' to pass around to the participants, and took copies of its more detailed information sheets. Beach responded to matters raised and questions asked at the forum and summarised the key matters in an email to RP on 20 February 2024.	
E40165	20/02/2024	Email	Outgoing	Link to website		Email outgoing. Sent summary email thanking RP for invitation for Beach to participate in the industry wide forum they arranged for their members. Recapped key discussion points and questions.	Relevant matter Beach has assessed the broad concerns raised about the offshore oil and gas activities on sea country and specifically to eels, whales and Deen maar as those matters have been identified in the EP, potential impacts have been assessed as ALARP and acceptable given control measures in the EP.	Advised EP was at completeness check stage before proceeding to public comment stage at which they may wish to make a submissions on matters not yet considered in the EP. Advised the EP includes an assessment of cumulative impacts in section 7.14. Recapped explanation of well plug and abandonment process and explained that wells have been monitored in accordance with existing EPs and they will be P&A during the next drilling campaign for which the rig will be available for those activities. Advised further responses on the question put at the meeting on 17 Feb 2024 regarding how Beach 'heals country': all industries have some impact and our EPs must demonstrate ALARP and acceptable impacts; overall footprint of activities is relatively small; we use marine mammal observers and contribute their data to universities; our vessel activities are relatively minor compared to shipping in Bass Strait; when our activities are completed we remove equipment such as explained in P&A activities. Recapped that at the meeting, Beach's assessment of key sea country cultural values were whales, eel and Deen maar was confirmed by the members and no other values or sensitivities were advised. Advised Beach understands RPs feedback that EPs are long and complex. Explained EPs are developed to meet regulations, they are are not provided for the consultation process as they developed using inputs from the consultation process (among other sources). Since June 2023, Beach has been providing project information in different detailed and summarised formats.	Existing measures in EP address potential impacts 6. Description of Environment, 6.6 First Nations describes RPs cultural values and sensitivities. 7.15 Environmental Performance Outcomes, Standards and Measurement Criteria shows overall environment protection measures and specifically: - CM03 Consultation for Implementation of the EP; - CM05 Seabed Survey; - CM08 Whale Management Procedure; - CM13 Beach Offshore Oil Pollution Emergency Plan.

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Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E42536	21/03/2024	Email	Incoming	N/A		Raised objection or claim Received correspondence on 21st March 2024 from Environmental Justice Australia on behalf of GMTOAC.Letter confirms they represent GMTOAC. Letter provides commentary of consultation process undertaken by Beach. Stakeholder has raised that: 1. Consultation has not commenced. 2. Consultation is insufficient. 3.Concerns around cumulative impacts and risks of all projects proposed that may impact Sea Country	Beach has assessed the claims and has provided a written response addressing the claims made by the RP. Refer to engagement IDE42537.	Refer to engagement ID E42537.	

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E42537	16/04/2024	Email	Outgoing	N/A		Raised objection or claim Beach Energy's response to correspondence sent 16 April	Objection or claim does not have merit 1. RP has claimed consultation has not commenced - Beach rejects the assertion. Consultation with GMTOAC and its members commenced in June 2023 and is complete. 2. RP claims that as per regulations, Beach is required provide reasonable opportunity to participate in consultation and that the consultation is to be appropriate and adapted to the nature and interests of the RP. - The consultation process between Beach and GMTOAC was guided by GMTOAC. Beach took direction from GMTOAC on how it wished to be consulted and with whom Beach should consult. GMTOAC preferred a joint consultation meeting at which Beach and proponents of other offshore projects were able to present on their projects (17 February 2024). 3. RP is concerned with cumulative impacts and risks to Sea Country from offshore operators.Beach has identified Gunditijamara Sea Country values and sensitivities, potential impacts to those values and sensitivities, cumulative impacts of the EP activities, and applicable control measures. Beach sought and received confirmation from GMTOAC that it had identified their Sea Country values. Beach also checked the Gunditjimara Nyamat Mirring Plan 2023-2033 published on 13 March 2024 and ensured all relevant cultural values and sensitivities were reflected in the EP.	Beach has provided a written response addressing the claims made by the RP. Refer to sensitive records for copy of response letter.	Existing measures in EP address potential impacts. 6. Description of Environment, 6.6First Nations describes RPs cultural values and sensitivities. 7.15 Environmental Performance Outcomes, Standards and Measurement Criteria shows overall environment protection measures and specifically: CM03Consultation for Implementation of the EP; CM05Seabed Survey; CM08Whale Management Procedure; CM13Beach Offshore Oil Pollution Emergency Plan.

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Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations

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Indigenous Entity ID: 243269640 - Land and Sea Aboriginal Corporation Tasmania

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39600	5/06/2023	Email	Outgoing			Email outgoing. Advised RP of upcoming OGV activities, which include seabed assessment (non seismic) and a drilling campaign. Provided dates for the upcoming campaign. Advised RP of the purpose for consultation under the regulations.	N/A no objections or claims made	N/A no objections or claims made	
E35242	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33936	16/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received Advised RP that previous EP (seabed assessment) has been submitted. Advised that consultation for the next phase (Drilling and P&A) is continuing and dates that consultation will close. Provided RP link to Engage Beach consultation hub. Advised RP of dates and times for the upcoming OGV information webinars. Provided RP an overview of consultation as per regulations.	N/A no objections or claims made	N/A no objections or claims made	
E33937	16/11/2023	Email	Incoming	Link to website		Advised don't want further consultation Received email response from RP advising that our email address is not on the approved senders list, therefore isn't sent.	N/A no objections or claims made	N/A no objections or claims made	
E34620	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received Reminded RP of the upcoming webinar details. Also provided a link to Engage Beach consultation hub.	N/A no response received	N/A no response received	
E39392	10/01/2024	Email	Outgoing	Link to website	Project update - timings	N/A no response received Advised RP the seabed assessment EP has been accepted by NOPSEMA. Advised RP that consultation for drilling and P&A EP is continuing and will close on 18th January 2024. Advised of timings for when EP is submitted to NOSPEMA Will advise RP when EP is open for public comment so they can participate in that process Advised RP Otway offshore project EP was accepted by NOPSEMA Encouraged RP to participate in consultation Provided link to Engage Beach consultation hub	N/A no objections or claims made	N/A no objections or claims made	
E39393	10/01/2024	Email	Outgoing	Link to website	Project update - timings	N/A no response received Advised RP the seabed assessment EP has been accepted by NOPSEMA. Advised RP that consultation for drilling and P&A EP is continuing and will close on 18th January 2024. Advised of timings for when EP is submitted to NOSPEMA. Will advise RP when EP is open for public comment so they can participate in that process. Advised RP Otway offshore project EP was accepted by NOPSEMA. Encouraged RP to participate in consultation. Provided link to Engage Beach consultation hub.	N/A no objections or claims made	N/A no objections or claims made	

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Indigenous Entity ID: 4194751 - Melythina tiakana warrana Aboriginal Corporation

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33924	16/11/2023	Email	Outgoing	Link to website	Project introduction	N/A no response received Advised RP that previous EP (seabed assessment) has been submitted. Advised that consultation for the next phase (Drilling and P&A) is continuing and dates that consultation will close. Provided RP link to Engage Beach consultation hub. Advised RP of dates and times for the upcoming OGV information webinars. Provided RP an overview of consultation as per regulations.	N/A no objections or claims made	N/A no objections or claims made	
E34630	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received Reminder to RP of upcoming online information webinars. Provided RP link to Engage Beach consultation hub.	N/A no response received	N/A no response received	
E39363	9/01/2024	Email	Outgoing	Link to website	Project update - timings	N/A no response received Advised RP the seabed assessment EP has been accepted by NOPSEMA. Advised RP that consultation for drilling and P&A EP is continuing and will close on 18th January 2024. Advised of timings for when EP is submitted to NOSPEMA Will advise RP when EP is open for public comment so they can participate in that process Advised RP Otway offshore project EP was accepted by NOPSEMA Encouraged RP to participate in consultation Provided link to Engage Beach consultation hub	N/A no response received	N/A no response received	

Indigenous Entity ID: 4194759 - Merrimans Local Aboriginal Land Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33970	20/11/2023	Phone	Outgoing	Link to website	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E33971	20/11/2023	Email	Outgoing	Link to website	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34321	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Indigenous Entity ID: 4194760 - New South Wales Aboriginal Land Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39329	23/11/2023	Email	Outgoing	Link to website	Project introduction	N/A no response received Introduced Beach to RP. RP is the regional representative for all NSW Aboriginal Land Councils. Advised providing an update on OGV, and requested RP forward onto relevant people. Explained to RP what a planning area is and why Bach are reaching out to them. Provided RP with information for upcoming Drilling and P&A information webinars and guidance on how to register. Provided RP with link to Engage Beach consultation hub. Advised RP that we are consulting with	N/A no response received	N/A no response received	

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Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						relevant state Government agencies and marine oil spill agencies. Advised P if they wish to consult to respond via one of the methods advised in the email.			
E39384	10/01/2024	Email	Outgoing	Link to website	Project update - timings	N/A no response received Beach advised RP the seabed assessment EP has been accepted by NOPSEMA. Beach advised RP that consultation for drilling and P&A EP is continuing and will close on 18th January 2024. Advised of timings for when current EP is submitted to NOSPEMA Will advise RP when EP is open for public comment so they can participate in that process. Advised RP Otway offshore project EP was accepted by NOPSEMA. Encouraged RP to participate in consultation. Provided link to Engage Beach consultation hub.	N/A no response received	N/A no response received	

Indigenous Entity ID: 20971523 - Tasmanian Aboriginal Centre

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39596	1/06/2023	Email	Outgoing	Info sheet	Project update - general	Email outgoing. Advised RP of upcoming OGV activities, which include seabed assessment (non seismic) and a drilling campaign. Provided dates for the upcoming campaign. Advised RP of the purpose for consultation under the regulations.	N/A no objections or claims made	N/A no objections or claims made	
E35448	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35449	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35450	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35451	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33928	16/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received Advised RP that previous EP (seabed assessment) has been submitted. Advised that consultation for the next phase (Drilling and P&A) is continuing and dates that consultation will close. Provided RP link to Engage Beach consultation hub. Advised RP of dates and times for the upcoming OGV information webinars. Provided RP an overview of consultation as per regulations.	N/A no objections or claims made	N/A no objections or claims made	
E34632	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received Reminder to RP of upcoming online information webinars. Provided RP link to Engage Beach consultation hub.	N/A no response received	N/A no response received	
E39387	10/01/2024	Email	Outgoing	Link to website	Project update - timings	N/A no response received	N/A no objections or claims made	N/A no objections or claims made	

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						Advised RP the seabed assessment EP has been accepted by NOPSEMA. Advised RP that consultation for drilling and P&A EP is continuing and will close on 18th January 2024. Advised of timings for when EP is submitted to NOSPEMA Will advise RP when EP is open for public comment so they can participate in that process Advised RP Otway offshore project EP was accepted by NOPSEMA Encouraged RP to participate in consultation. Provided link to Engage Beach consultation hub.			

Indigenous Entity ID: 4194746 - Tasmanian Aboriginal Heritage Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33921	16/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received Advised RP that previous EP (seabed assessment) has been submitted. Advised that consultation for the next phase (Drilling and P&A) is continuing and dates that consultation will close. Provided RP link to Engage Beach consultation hub. Advised RP of dates and times for the upcoming OGV information webinars. Provided RP an overview of consultation as per regulations.	N/A no response received	N/A no response received	
E39359	9/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received Advised RP the seabed assessment EP has been accepted by NOPSEMA. Advised RP that consultation for drilling and P&A EP is continuing and will close on 18th January 2024. Advised of timings for when EP is submitted to NOSPEMA Will advise RP when EP is open for public comment so they can participate in that process Advised RP Otway offshore project EP was accepted by NOPSEMA Encouraged RP to participate in consultation Provided link to Engage Beach consultation hub	N/A no response received	N/A no response received	

Indigenous Entity ID: 4194747

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33922	16/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received Beach advised RP that previous EP (seabed assessment) has been submitted. Advised RP that consultation for the next phase (Drilling and P&A) is continuing and dates that consultation will close. Provided RP link to Engage Beach consultation hub. Advised RP of dates and times for the upcoming OGV information webinars. Provided RP an overview of consultation as per regulations.	N/A no objections or claims made	N/A no objections or claims made	
E34633	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received Reminder to RP of upcoming online	N/A no response received	N/A no response received	

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Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						information webinars. Provided RP link to Engage Beach consultation hub.			
E39360	9/01/2024	Email	Outgoing	Link to website	Project update - timings	N/A no response received Advised RP the seabed assessment EP has been accepted by NOPSEMA. Advised RP that consultation for drilling and P&A EP is continuing and will close on 18th January 2024. Advised of timings for when EP is submitted to NOSPEMA Will advise RP when EP is open for public comment so they can participate in that process Advised RP Otway offshore project EP was accepted by NOPSEMA Encouraged RP to participate in consultation Provided link to Engage Beach consultation hub	N/A no response received	N/A no response received	

Indigenous Entity ID: 293601291 - Victorian Aboriginal Heritage Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39496	29/08/2023	Email	Outgoing	N/A	Project introduction	Acknowledgement of Beach email Consulted with RP to identify any additional RP's in the activity area. Advised them of the RP's we have identified and sought their endorsement for our identification methodology	N/A no objections or claims made	N/A no objections or claims made	No additional measures or controls are required
E39499	1/09/2023	Email	Incoming			Acknowledgement of Beach email RP advised that only Eastern Maar and Bunurong are in the scope of our offshore activity Advised that should works be conducted outside of commonwealth waters then Aboriginal heritage ct would be triggered	Not a relevant matter RP's advice on State based heritage act is not relevant to the activities in this EP	N/A no objections or claims made	No additional measures or controls are required
E39497	25/09/2023	Email	Outgoing	N/A		Acknowledgement of Beach email Confirmed on whose country we operate Advised RP that we have been regualry consulting with Eastern Maar and Bunurong, however for offshore activities regulations require us to identify any additonal First Nations groups with connection to sea country who may be considered relevant under regulations Asked RP to identify any other Victorian First Nations groups who may be relvant Confirmed to RP that no development is happening in State waters that will trigger compliance under the state legislation	N/A no objections or claims made	N/A no objections or claims made	No additional measures or controls are required
E39498	27/09/2023	Email	Outgoing			Acknowledgement of Beach email Sent email thanking RP for supporting our methodology for identifying relevant First Nations groups Advised that we would welcome the opportunity to present to the council in December	N/A no objections or claims made	N/A no objections or claims made	No additional measures or controls are required
E37327	13/11/2023	Email	Incoming	N/A	Project update - general	Requested consultation RP confirming details (time, date, location) for upcoming meeting RP confirming Beach will still be presenting	N/A no objections or claims made	N/A no objections or claims made	No additional measures or controls are required
E37328	14/11/2023	Email	Incoming	Link to website	Project update - general	Requested consultation	N/A no objections or claims made	N/A no objections or claims made	

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						RP confirming details for presentation to Council. RP requested we provide presentation materials by COB 27th Nov 2023			
E39495	14/11/2023	Email	Outgoing	Link to website	Project update - general	Requested consultation Requested additional details for meeting on 7th December 2023.	N/A no objections or claims made	N/A no objections or claims made	
E33938	16/11/2023	Email	Outgoing	Link to website	Project update - general	Requested consultation Thanked RP for the opportunity to present our activities. Confirmed we will have presentation materials provided by requested date.	N/A no objections or claims made	N/A no objections or claims made	No additional measures or controls are required
E33947	17/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received Provided RP update on OGV activities. Asked RP to share with those who may be relevant. Advised seabed assessment EP has been submitted to NOPSEMA and is under assessment. Advised that consultation for the drilling and P&A EP is continuing Provided RP with link to Engage Beach consultation hub Advised details of the upcoming information sessions Provided a description of the purpose of consultation for the development of EP's Advised of dates we are planning to submit the drilling and P&A EP Provided RP link to Engage Beach again Encouraged RP to attend webinar	N/A no objections or claims made	N/A no objections or claims made	
E33952	17/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received Advised RP that previous EP (seabed assessment) has been submitted. Advised that consultation for the next phase (Drilling and P&A) is continuing and dates that consultation will close. Provided RP link to Engage Beach consultation hub. Advised RP of dates and times for the upcoming OGV information webinars. Provided RP an overview of consultation as per regulations.	N/A no objections or claims made	N/A no objections or claims made	
E34619	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received Reminder to RP of the upcoming three information webinar and how to register provided RP link to Engage Beach consultation hub	N/A no response received	N/A no response received	
E37330	24/11/2023	Email	Incoming	N/A	Project update - general	Requested consultation RP confirming attendance details for upcoming meeting.	N/A no objections or claims made	N/A no objections or claims made	
E39430	7/12/2023	Meeting - in person		Link to website	Project introduction	RP made up of 8 First Nations people from across Victoria. Meeting to provide an update to RP about Beach OGV project. Provided introduction who we are where we operate. Advised that we have historically consulted with EMAC and Bunurong due to assets on their Country, however understanding the	Relevant matter Questions raised are relevant matters to the activities in this EP and were answered at the meeting.	Beach advised we have very strict marine mammal management plans and control measures as per EPBC act. Beach advised the OGV drilling and P&A activities will not impact crayfish due to no new infrastructure. Beach advised the OGV projects do not require additional infrastructure to be installed on the land therefore there is no	No additional measures or controls are required

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						interconnectedness of sea country and the EMBA area, we are consulting all groups with connection to Sea Country. Introduced OGV project and the purpose of consultation which is to understand any concerns and provide opportunity to ask questions Shared EMBA map and explained that it's a map of 200 different scenarios, following an extremely unlikely event of loss of hydrocarbon, advised of our requirements under regulations to respond to an incident. Provided RP with a explanation of the purpose of our engage Beach consultation hub. RP asked why we are presenting to them as they deal with cultural heritage legislation. Advised RP that we are required to identify all RP First Nations groups with connection to sea country. Questions asked: RP asked whether there will be any impact to whales. RP asked whether activities will impact crayfish. RP asked whether the activities will impact any middens located in the coastal area? RP asked if there ever been a a major gas spill?		impact to middens. Should any additional infrastructure be required at any point, we would ensure all requirements under the relative legislations are met. Beach advised in high concentrations hydrocarbons can kill fish, however this is why we have thorough emergency responses to reduce any impact on fish, in the event of an incident the department will undertake testing of fish to ensure they are still are for consumption. Beach advised that not in Victoria, Beach has never had a major incident. Advised we are heavily related and we must have an EP for every individual activity.	
E39395	10/01/2024	Email	Outgoing	Link to website	Project update - timings	N/A no response received Advised RP the seabed assessment EP has been accepted by NOPSEMA. Advised RP that consultation for drilling and P&A EP is continuing and will close on 18th January 2024. Advised of timings for when EP is submitted to NOSPEMA Will advise RP when EP is open for public comment so they can participate in that process Advised RP Otway offshore project EP was accepted by NOPSEMA Encouraged RP to participate in consultation Provided link to Engage Beach consultation hub	N/A no objections or claims made	N/A no objections or claims made	
E39396	10/01/2024	Email	Outgoing	Link to website	Project update - timings	N/A no response received Advised RP the seabed assessment EP has been accepted by NOPSEMA. Advised RP that consultation for drilling and P&A EP is continuing and will close on 18th January 2024. Advised of timings for when EP is submitted to NOSPEMA Will advise RP when EP is open for public comment so they can participate in that process Advised RP Otway offshore project EP was accepted by NOPSEMA Encouraged RP to participate in consultation Provided link to Engage Beach consultation hub	N/A no objections or claims made	N/A no objections or claims made	

Indigenous Entity ID: 4194727 - Wadawurrung Traditional Owners Aboriginal Corporation

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39603	5/06/2023	Email	Outgoing	Info sheet	Project update - general	Email outgoing. Advised RP of upcoming OGV activities, which include seabed assessment (non seismic) and a drilling campaign. Provided dates for the upcoming campaign. Advised RP of the purpose for consultation under the regulations.	N/A no objections or claims made	N/A no objections or claims made	
E33904	15/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received Provided RP update on OGV drilling and P&A timings. Consultation for this EP is continuing. Provided link to Engage Beach consultation hub. Advised RP the seabed assessment EP had been submitted. Provided RP details for upcoming webinars for EP activities. Advised RP's purpose of consultation. Advised RP	N/A no response received	N/A no response received	
E34703	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received Reminder to RP of upcoming online information webinars. Provided RP link to Engage Beach consultation hub.	N/A no response received	N/A no response received	
E39353	9/01/2024	Email	Outgoing	Link to website	Project update - timings	Requested consultation Advised RP the seabed assessment EP has been accepted by NOPSEMA. Advised RP that consultation for drilling and P&A EP is continuing and will close on 18th January 2024. Advised of timings for when EP is submitted to NOSPEMA Will advise RP when EP is open for public comment so they can participate in that process Advised RP Otway offshore project EP was accepted by NOPSEMA Encouraged RP to participate in consultation Provided link to Engage Beach consultation hub	N/A no objections or claims made	N/A no response received	
E39354	9/01/2024	Email	Outgoing	Link to website	Project update - timings	Requested consultation	N/A no response received	N/A no response received	
E39485	9/01/2024	Email	Incoming	Link to website	Project update - timings	Requested consultation RP advised they would contact me to discuss further on 10th Jan 2024	N/A no objections or claims made	N/A no objections or claims made	
E39486	10/01/2024	Email	Incoming	N/A		Requested consultation RP unable to meet on the 10th, requested a time to discuss on the 11th Jan 2024	N/A no objections or claims made	N/A no objections or claims made	
E39487	10/01/2024	Email	Incoming	N/A		Requested consultation RP supported setting up a Teams meeting to discuss when additional representative returns from leave	N/A no objections or claims made	N/A no objections or claims made	
E39488	15/01/2024	Email	Incoming			Acknowledgement of Beach email RP accepted Teams meeting established for 17th Jan 2024 to discuss OGV drilling and P&A	N/A no objections or claims made	N/A no objections or claims made	
E39489	15/01/2024	Email	Incoming	N/A	Project update - general	Acknowledgement of Beach email RP advised they have been in the field and	N/A no objections or claims made	N/A no objections or claims made	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						confirmed meeting on 17th Jan 2024.			
E39490	15/01/2024	Email	Outgoing	N/A	Project update - general	Requested consultation RP requested consultation for drilling and P&A EP. Advised RP of date for Teams meeting.	N/A no objections or claims made	N/A no objections or claims made	
E39492	15/01/2024	Email	Outgoing	Link to website	Project update - general	Requested consultation Meeting invite to discuss OGV Drilling and P&A as requested. provided link to Engage Beach consultation hub and attached power point presentation in preparation for meeting.	N/A no objections or claims made	N/A no objections or claims made	
E39493	15/01/2024	Email	Incoming			Requested consultation RP confirmed Wednesday 17th Jan for our meeting.	N/A no objections or claims made	N/A no objections or claims made	
E39484	17/01/2024	Meeting - online		Link to website	Project update - general	Requested consultation RP representatives requested a meeting to discuss OGV. Meeting involved Sea and Coastal project officer and Environment officer. Beach provided RP's with a description of the OGV drilling and P&A project. Advised of requirements under regulations to consult with RP's. Advised RP's that each activity requires an EP and we are required to address all relevant concerns about potential impacts in our EP to as low as reasonably practical. Discussed the EMBA with RP. RP question: Why is there a need for gas when Victoria is phasing gas out with new clean energy legislation? Advised RP that the Government issues the permits to explore for resources based on supply and demand. Advised RP that gas plays a role in the energy transition and there are houses and industry that still rely heavily on gas production. Advised RP that the Beach OGV project is maintain levels of production at our existing facilities and we will not be constructing new infrastructure. RP thanked me for that was his next question. Beach advised of the previous conversations with RP representatives and shared with them the cultural values and sensitivities that have been shared with us in the past, asked RP if there were any additional cultural values and sensitivities they would like to share with me. RP advised that we have covered everything. Asked RP if they are happy with material sent through. RP advised yes they are happy, would like more pictures as the presentation shared today has been very helpful and advised they would like to continue to be updated. Asked RP if there is anyone else we should be sending updates too. RP advised that they are the most appropriate people at the corporation and they will forward them on, where relevant. RP advised that they discuss these activities with broader community. RP thanked us for the meeting, advised it	N/A no objections or claims made	N/A no objections or claims made	

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						was very helpful in understanding our activities.			
E39618	31/01/2024	Email	Outgoing			N/A Email outgoing. Provided RP with follow up from meeting on the 17th of January. Email outlined conversation we had regarding the OGV drilling and P&A campaign and as per our discussions Beach's requirement under the regulations to consult in the development of an EP. Advised RP of the cultural values and sensitivities shared during previous engagements and asked RP to confirm they were correct, to which RP confirmed. Email summarised conversation Beach had with RP as to why gas is being produced. Beach responded to RP's question asked during the meeting, as to how long we monitor plug and abandoned wells, with a description of how wells are plugged and abandoned and our requirements under the regulations. Email to RP confirmed that, as per conversation, they are the most appropriate person to consult with, and as discussed in meeting they will forward emails onto relevant people. RP advised they would like to continue to be updated of offshore activities and Beach advised that we will continue to keep them updated.	Relevant matter During development of previous EPs and this EP, Beach has reviewed RP publications and has consulted with RP to understand cultural values and sensitivities of Sea Country that have been documented in section 6.6.3. For consultation in relation to development of this EP Beach has provided information on the activities, potential impacts and control measures in this EP to multiple representatives including Executive, Managers, and cultural heritage roles. Beach has advised that this EP would be submitted for a completeness check by NOPSEMA, that the EP would be published for public comment and Beach would advise them so that they can participate in that process if they wish. Throughout the consultations, no specific concerns have been raised.	Beach has provided sufficient information and demonstrated reasonable efforts to consult with RP. In section 6.6.3 of this EP, Beach has documented the cultural values and sensitivities learned through consultation with RP and from RP publications, from specialist archaeological consulting firm and literature reviews. Consultation for the development of this EP has been completed. Should new information be received from the RP on cultural values applicable to the activities in this EP, it will be assessed and where Beach considers appropriate, Beach will apply its Management of Change Standard (section 8.3.4).	Existing measures in EP address potential impacts Control Measure 03: Consultation for Implementation of EP.

Indigenous Entity ID: 4194758 - Wagonga Local Aboriginal Land Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33951	17/11/2023	Email	Outgoing	Link to website	Project introduction	N/A no response received Beach provided RP an overview of OGV drilling and P&A. Advised RP that whilst they may a distance form our activities, they may have an interest based on our planning area. Beach provided RP with a description as to hat a planning area means and how risks are mitigated. Beach provided RP a link to Engage Beach consultation hub if they are interested in our activities. Beach provided RP with the details for the three OGV drilling and P&A webinars, advising the RP how to register if they are interested.	N/A no response received	N/A no response received	
E34563	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received Provided RP with a reminder of upcoming OGV drilling and P&A webisnars, and how to register. Beach provided RP with a link to Engage Beach consultation hub to learn more about our offshore activities, including what we are currentlyy consulting on.	N/A no response received	N/A no response received	

Indigenous Entity ID: 4194726

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39601	5/06/2023	Email	Outgoing	Info sheet	Project update - general	Email outgoing. Advised RP of upcoming OGV activities, which include seabed assessment (non	N/A no objections or claims made	N/A no objections or claims made	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						seismic) and a drilling campaign. Provided dates for the upcoming campaign. Advised RP of the purpose for consultation under the regulations.			
E35307	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E36191	22/08/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no objections or claims made	N/A no objections or claims made	
E38375	4/10/2023	Phone	Outgoing	N/A	Project update - general	N/A no response received	N/A no objections or claims made	N/A no objections or claims made	
E33903	15/11/2023	Email	Outgoing	Link to website	Project update - general		N/A no response received	N/A no response received	
E34634	21/11/2023	Email	Outgoing	Link to website	Project update - general		N/A no response received	N/A no response received	
E39345	9/01/2024	Email	Outgoing	Link to website	Project update - general		N/A no response received	N/A no response received	
E39402	9/01/2024	Email	Incoming	N/A	Project update - general	Raised objection or claim RP responded with a general objection to oil and gas industry, unspecified impacts to sonlines and country, and disagreement with NOPSEMA approval process.	Relevant matter Beach understands general concerns about sea country, however specific concerns about the impacts of the EP have not been raised.		Existing measures in EP address potential impacts
E39568	10/01/2024	Email	Outgoing	N/A		Raised objection or claim Email outgoing.	Relevant matter Beach has undertaken consultation with RP for previous EP's. Arising from consultations and from publicly available social media content and posts by the RP, Beach established that the RP is opposed broadly to the offshore industry and in particular to seismic activities. RP is concerned about seismic surveys on whale migration routes and songlines. Beach has advised the RP that the OGV Project, including the seabed assessment does not include seismic surveys.	Beach has acknowledged RP's email and advised confidence in the environmental regulations and assessment processes.	Existing measures in EP address potential impacts Control measure 07: Whale Management procedure.

Local Authorities Entity ID: 239075353 - Apollo Bay Surf Life Saving Club

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36209	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34936	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33291	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33996	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39024	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 1349 - Bass Coast Shire Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36235	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34971	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33325	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34030	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39025	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39026	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39027	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39028	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39029	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39030	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 239075490 - Beachport Surf Life Saving Club

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36248	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34981	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33334	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34039	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39031	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 25165833 - Bega Valley Shire Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33335	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33963	20/11/2023	Email	Outgoing	Link to website	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34613	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34042	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39032	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 268435549 - Burnie City Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33346	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34054	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39033	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
Local Authorities Entity ID: 1357 - Cardinia Shire Council									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36256	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35011	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33348	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34063	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39034	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39035	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39036	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39037	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39038	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39039	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39040	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39041	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39435	15/01/2024	Email	Incoming	Info sheet update	Project update - general	Acknowledgement of Beach email Acknowledged email.	N/A no objections or claims made	N/A no objections or claims made	
Local Authorities Entity ID: 239075483 - Circular Head Council									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33358	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34066	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39042	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39043	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39044	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39438	15/01/2024	Email	Incoming	Info sheet update	Project update - general	Acknowledgement of Beach email	N/A no objections or claims made	N/A no objections or claims made	
Local Authorities Entity ID: 268435522 - City of Port Phillip									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36257	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35012	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33359	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34067	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39045	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 239075407 - Colac Otway Shire Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36263	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35017	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34076	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39049	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39432	15/01/2024	Email	Incoming	Info sheet update	Project update - general	Acknowledgement of Beach email Thanks for the update.	N/A no objections or claims made	N/A no objections or claims made	

Local Authorities Entity ID: 1038 - Corangamite Shire Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36285	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36286	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36287	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36288	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36289	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36290	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36291	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36292	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36293	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36294	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35042	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35043	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35044	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35045	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35046	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35047	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35048	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35049	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35050	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35051	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35052	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35053	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35054	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35055	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35056	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35057	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35058	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34100	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34101	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34102	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34103	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34104	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34105	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34106	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34107	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34108	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34109	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34110	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34111	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34112	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34113	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34114	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34115	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34116	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E36747	27/11/2023	Email	Incoming		Project update - locations	Requested consultation Requested webinar details	N/A no objections or claims made	N/A no objections or claims made Webinar details sent	
E36748	27/11/2023	Email	Outgoing		Project update - locations	Requested consultation Webinar details sent	N/A no objections or claims made	N/A no objections or claims made	
E39070	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 1903 - District Council of Grant

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36352	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35117	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33475	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34182	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39073	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 268435476 - East Gippsland Catchment Management Authority

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36358	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35121	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33478	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34187	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34675	22/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E39074	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 268435479 - East Gippsland Shire Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36359	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35122	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33479	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34188	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34676	22/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E39075	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 25165834 - Eurobodalla Shire Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33493	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33965	20/11/2023	Email	Outgoing	Link to website	Project introduction	N/A no response received Reaching oit to new RP,noting the activity is a long distance from their location	N/A no response received	N/A no response received	
E34612	21/11/2023	Email	Outgoing	Link to website	Project update - general	Acknowledgement of Beach email Email trying to confirm correct contact	N/A no objections or claims made	N/A no objections or claims made	
E34608	21/11/2023	Email	Incoming	Link to website	Project update - general	Acknowledgement of Beach email Confirmed correct contacts.	N/A no objections or claims made	N/A no objections or claims made	
E34205	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39433	8/01/2024	Email	Incoming	Link to website	Project update - general	Acknowledgement of Beach email Acknowledged email	N/A no objections or claims made	N/A no objections or claims made	
E39077	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 268435480 - Flinders Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36380	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35160	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33509	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34221	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39078	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 268435484 - Gippsland Ports

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36390	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35173	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35174	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33522	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33523	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34234	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34235	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39079	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39080	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 201326593 - Glenelg Hopkins Catchment Management Authority

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36391	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36392	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35175	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35176	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33524	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33525	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34236	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34237	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39081	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39082	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 239075484 - Glenelg Shire Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35177	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35178	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33526	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33527	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34238	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34239	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39083	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39084	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 268435521 - Greater Geelong Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36402	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35189	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35190	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35191	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33539	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33540	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33541	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33958	20/11/2023	Email	Incoming	Link to website	Project update - locations	Requested consultation Requested webinar registration details.	N/A no objections or claims made		
E33959	20/11/2023	Email	Outgoing	Link to website	Project update - locations	Requested consultation Webinar details sent.	N/A no objections or claims made	N/A no objections or claims made	
E34251	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34252	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34253	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34254	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39553	29/11/2023	Info Session				Requested consultation Asked how many new wells Beach are anticipating to drill? Attendee asked why the abandoned wells hadn't been P&A previously	Relevant matter	Firm is 2 exploration plus 3 new wells. Optional campaign to see if we add more, up to 11. Likely previous companies thought they could be viable and also and common practice 30/40 years ago to leave abandoned until later. Beach has a different policy and would prefer to P&A as soon as we confirm viability. Our geologists have confirmed that these P&A are in the wrong spot	
E39085	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39086	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39087	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39088	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
Local Authorities Entity ID: 25165832 - Huon Valley Council									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33545	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33966	20/11/2023	Email	Outgoing	Link to website	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34611	21/11/2023	Email	Incoming	Link to website	Project update - general	Acknowledgement of Beach email Confirmed correct contact.	N/A no objections or claims made	N/A no objections or claims made	
E34614	21/11/2023	Email	Outgoing	Link to website	Project update - general	Acknowledgement of Beach email Email trying to confirm correct contact.	N/A no objections or claims made	N/A no objections or claims made	
E34258	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39089	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
Local Authorities Entity ID: 8388624 - King Island Council									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36421	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35225	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39468	25/08/2023	Email	Outgoing		Project update - general	Acknowledgement of Beach email Confirmation from Beach that we will hold a community meeting as requested.	N/A no objections or claims made	N/A no objections or claims made	
E39469	12/09/2023	Email	Incoming		Project update - general	Acknowledgement of Beach email Mayor confirmed they accept our notes from the council meeting.	Objection or claim does not have merit	N/A no objections or claims made	
E39470	12/09/2023	Email	Outgoing		Project update - general	Acknowledgement of Beach email Beach Energy notes from meeting with King Island Council.	N/A no objections or claims made	N/A no objections or claims made	
E39467	5/10/2023	Meeting - in person			Project update - general	Advised don't want further consultation Short chat with Mayor to explain we had zero attendees for the drop-in. Mayor agreed that we had tried and that locals are more interested in other proponents projects.	N/A no objections or claims made	N/A no objections or claims made	
E39987	26/10/2023	Email	Outgoing		Project update - locations	Requested consultation Explanation emergency spill response process	N/A no objections or claims made	N/A no objections or claims made	
E39988	27/10/2023	Email	Incoming		Project update - locations	Acknowledgement of Beach email Acknowledged Beach email.	N/A no objections or claims made	N/A no objections or claims made	
E33564	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34278	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39091	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
Local Authorities Entity ID: 268435511 - Lakes Entrance Surf Life Saving Club									

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36437	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35241	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33579	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34292	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39092	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 1617 - Mornington Peninsula Shire Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36457	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35271	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33610	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34324	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39093	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 1204 - Moyne Shire Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36463	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35272	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33611	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33612	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33613	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33614	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33615	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33616	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33617	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33618	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34604	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E37319	28/11/2023	Meeting - online			Project update - locations	Requested consultation asked if we were building any new	Relevant matter	Beach confirmed that we will tie in any firm	

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						offshore/onshore infrastructure. Beach confirmed that we will tie in any firm and optional wells into the existing platforms and pipelines.		and optional wells into the existing platforms and pipelines.	
E38684	30/11/2023	Info Session			Project update - locations	Requested consultation How long does it take to abandon a well once everything is in place? Including ships? Brad advised it will be 15 days of activities in the Otway and 21-22 days of activity in Bass. Moyne Shire advised a good level of communications are coming through from Beach.	Relevant matter	Brad advised it will be 15 days of activities in the Otway and 21-22 days of activity in Bass.	
E39102	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received Consultation in the course of preparation of the EP has been completed in accordance with the OPPGS (E) Regulations. Beach engages in ongoing consultation during the implementation of this EP and Relevant Persons can provide feedback to Beach on any new relevant matters that may emerge. Beach will assess any new matters and where appropriate, Beach will apply its Management of Change Standard (section 8. 3.4.).	N/A no response received	N/A no response received	

Local Authorities Entity ID: 1657 - Port Campbell Surf Life Saving Club

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36509	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36510	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36511	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35347	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35348	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35349	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33694	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33695	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33696	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34408	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34409	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34410	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39103	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39104	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39105	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 239075494 - Port Fairy Surf Life Saving Club

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36519	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35354	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33702	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34416	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39106	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 239075491 - Portland Surf Life Saving Club

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36526	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35361	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33709	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34423	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39107	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 1910 - Robe District Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36533	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35372	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33723	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34436	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39109	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 268435512 - Seaspray Surf Life Saving Club

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36549	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35398	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33751	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34465	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39110	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 268435523 - South Gippsland Shire Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36551	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35402	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33756	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34472	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39112	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 4194587 - Surf Coast Shire Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36585	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36586	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36587	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36588	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36589	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35430	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35431	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35432	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35433	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35434	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35537	14/07/2023	Email	Incoming	Info sheet	Project update - general	Advised don't want further consultation Please remove from database.	Not a relevant matter	Removed from database.	
E33779	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33780	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33781	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33782	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34495	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34496	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34497	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34498	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39113	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39114	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39115	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39116	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 268435514 - Venus Bay Surf Life Saving Club

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36614	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35482	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33829	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34546	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39117	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 268435483 - Waratah Wynyard Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36627	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35501	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33846	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34564	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39118	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 1728 - Warrnambool City Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36628	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36629	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35502	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35503	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34903	13/10/2023	Email	Outgoing		Project update - general	N/A no response received Introduction of new Senior Manager in Vic and request to consult on OGV	N/A no response received	N/A no response received	
E33847	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33848	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34565	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34566	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39119	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39120	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 4773 - Warrnambool Surf Life Saving Club

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36632	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35507	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33853	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34571	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39121	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 1478 - Warrnambool Volunteer Coast Guard

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36634	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36635	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35509	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35510	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33855	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33856	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34573	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34574	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39122	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39123	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 1899 - Wattle Range Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36640	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36642	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36644	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35514	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35516	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35518	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33859	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33860	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33861	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34577	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34578	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34579	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39124	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39125	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39126	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39439	15/01/2024	Email	Incoming	Info sheet update	Project update - general	Acknowledgement of Beach email	N/A no objections or claims made	N/A no objections or claims made	

Local Authorities Entity ID: 268435482 - Wellington Shire Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36647	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35521	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35522	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33864	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33865	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34582	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34583	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39127	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39128	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 25165831 - West Coast Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33867	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33968	20/11/2023	Email	Outgoing	Link to website	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34616	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34610	21/11/2023	Email	Incoming	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34585	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39129	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39437	15/01/2024	Email	Incoming	Info sheet update	Project update - general	Acknowledgement of Beach email Acknowledged Beach email	N/A no objections or claims made	N/A no objections or claims made	

Local Authorities Entity ID: 268435477 - West Gippsland Catchment Authority

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36648	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35523	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33868	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34586	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39130	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Local Authorities Entity ID: 239075498 - Wye River Surf Life Saving Club

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36653	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36654	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35532	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35533	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33876	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33877	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34594	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34595	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39131	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39132	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Marine Based Industries Entity ID: 268435486 - Bass Strait Freight

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36241	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34972	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33326	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34031	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39136	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Marine Based Industries Entity ID: 268435487 - Bass Strait Transport

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36242	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34975	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33329	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34034	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39137	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Marine Based Industries Entity ID: 1483 - Basslink

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36243	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34976	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33331	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34036	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39138	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39139	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Marine Based Industries Entity ID: 268435540 - BW Digiital

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35541	9/08/2023	Email	Incoming		Project introduction	Requested consultation	N/A no objections or claims made	N/A no objections or claims made	
E33347	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34055	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39141	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Marine Based Industries Entity ID: 268435488 - CRE Solutions

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36295	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35059	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33409	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34117	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39142	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Marine Based Industries Entity ID: 268435492 - Currie Cargoes

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36296	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35060	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33410	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34118	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39143	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Marine Based Industries Entity ID: 268435493 - Eastern Line Shipping

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36360	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35123	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33480	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34189	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39144	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Marine Based Industries Entity ID: 268435494 - Freight Connections

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36381	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35163	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33510	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34222	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39145	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Marine Based Industries Entity ID: 268435489 - Fresh Freight Tasmania

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36382	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35165	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33512	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34224	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39146	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Marine Based Industries Entity ID: 25165838 - Indigo Subsea Cable Consortium

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33547	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34260	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39147	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Marine Based Industries Entity ID: 239075456 - Kelp Industries Pty Ltd

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36415	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36416	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35217	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35218	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33557	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33558	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34270	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34271	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39148	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39149	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Marine Based Industries Entity ID: 268435517 - Kina Commercial Diving

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36417	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35220	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33560	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34273	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39150	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Marine Based Industries Entity ID: 239075423 - King Island Shipping Group

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36432	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35230	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33568	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34281	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38998	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Marine Based Industries Entity ID: 4194535 - Marinus Link

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36455	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35260	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33606	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34319	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39159	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Marine Based Industries Entity ID: 4194679 - Optus

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33641	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33642	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34356	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39161	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Marine Based Industries Entity ID: 268435533 - Port Anthony

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35334	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33681	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34395	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39162	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Marine Based Industries Entity ID: 239075486 - Port of Portland

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36523	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35357	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33706	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34420	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39163	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Marine Based Industries Entity ID: 268435532 - Qube Ports

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33714	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34428	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39165	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Marine Based Industries Entity ID: 4194538 - SeaRoad Holdings Pty Ltd

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36548	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35397	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33750	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34464	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39166	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Marine Based Industries Entity ID: 1012 - Spirit of Tasmania

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36574	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36575	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36576	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35418	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35419	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35420	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33769	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33770	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33771	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34485	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34486	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34487	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39167	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39168	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39169	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Marine Based Industries Entity ID: 268435526 - Star of the South

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36577	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35421	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33772	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34488	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39170	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Marine Based Industries Entity ID: 25165860 - SUBCO

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E38644	21/12/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E38645	21/12/2023	Email	Outgoing	Link to website	Project introduction	Requested consultation Requested correct contact to discuss OGV activities.	N/A no objections or claims made	N/A no objections or claims made	
E38646	21/12/2023	Email	Incoming		Project introduction	Requested consultation	N/A no objections or claims made	N/A no objections or claims made	
E38706	4/01/2024	Email	Outgoing		Project introduction	Requested consultation	N/A no objections or claims made	N/A no objections or claims made	
E39171	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39456	15/01/2024	Meeting - online			Project introduction	Requested consultation Meeting to explain both parties projects. No concerns raised on either side. Consultation in the course of preparation of the EP has been completed in accordance with the OPPGS (E) Regulations. Beach engages in ongoing consultation during the implementation of this EP and Relevant Persons can provide feedback to Beach on any new relevant matters that may emerge. Beach will assess any new matters and where appropriate, Beach will apply its Management of Change Standard (section 8. 3.4.).	N/A no objections or claims made	N/A no objections or claims made	

Marine Based Industries Entity ID: 239075433 - Superloop

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36584	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35429	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33778	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34494	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39172	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Marine Based Industries Entity ID: 239075489 - Tasports

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36599	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35456	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33800	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34517	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39174	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Marine Based Industries Entity ID: 1019 - Telstra

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35538	14/07/2023	Email	Incoming	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34899	13/10/2023	Email	Incoming		Project update - general	Acknowledgement of Beach email Provided Telstra contact for Indigo Central.	N/A no objections or claims made	N/A no objections or claims made Added new contact to database	
E33810	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34520	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39182	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Marine Based Industries Entity ID: 1020 - Toll Group

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36607	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35473	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33819	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34536	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39183	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 239075339 - Apollo Bay Police and Ocean Rescue

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36207	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34934	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33289	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33994	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39184	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 4999 - Tasmanian Member for North West, West Coast and King Island

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36371	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35140	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33496	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33962	20/11/2023	Email	Incoming	Link to website	Project update - locations	Acknowledgement of Beach email Email thanking for invite to webinars.	N/A no objections or claims made	N/A no objections or claims made	
E34208	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39227	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 155189270 - Member for Western Victoria

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36389	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35172	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33521	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34233	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39228	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 184549378 - Great Ocean Road Coast and Parks Authority

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36397	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35183	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35184	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33532	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33533	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33534	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34244	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34245	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34246	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39229	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39230	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39231	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
State Government Entity ID: 239075478 - MP State Member for Port Adelaide									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36464	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E33619	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34333	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39233	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
State Government Entity ID: 25165844 - NSW Port Authority - Port of Eden									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33705	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34419	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39235	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
State Government Entity ID: 4194371 - Office of the Member for Northern Victoria Region									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36472	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36473	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35292	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35293	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33634	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33635	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34348	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34349	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39236	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
State Government Entity ID: 4194373 - Office of the Member for Polwarth									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36474	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35294	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33636	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34350	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39237	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 4194374 - Office of the Member for South West Coast

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36475	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35295	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33637	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34351	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39238	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 155189260 - Office of the Member for Western Victoria

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36476	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35296	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33638	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34352	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39239	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 205520898 - Port Campbell Police

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36506	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35340	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33687	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34401	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39252	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 155189261 - State Member for Western Victoria Region

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36578	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36580	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36582	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36579	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36581	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36583	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35422	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35424	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35426	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35423	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35425	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35427	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34902	13/10/2023	Email	Incoming		Project update - general	Acknowledgement of Beach email	N/A no objections or claims made	N/A no objections or claims made	
E33773	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33774	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33775	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34489	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34490	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34491	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39253	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39254	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39255	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

State Government Entity ID: 239075421 - Victorian Marine and Coastal Council

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36621	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35490	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33837	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34554	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39260	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 1451 - 12 Apostles Helicopters & Port Campbell Heliport

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36199	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34910	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33268	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33973	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38793	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 1469 - Apollo Bay Dive Centre and Surf n Fish

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36203	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34929	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33284	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33989	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39261	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 239075338 - Apollo Bay Fishing Charters

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36205	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34933	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33288	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33993	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39263	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 239075341 - Apollo Bay Surf & Kayak

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36208	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34935	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33290	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33995	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39264	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 239075342 - Apollo Bay Visitor Information Centre

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36210	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34937	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33292	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33997	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39265	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 268435474 - Australian Recreational Fishing Foundation

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36232	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34960	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33314	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34019	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39266	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 25165859 - Coastlife

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E38361	19/12/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E39267	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 1530 - Dive Industry Association of Australia

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36355	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35119	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33476	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34185	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39268	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 268435500 - Far Out Fishing Charters

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36370	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35139	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33495	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34207	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34681	22/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E39269	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 25165856 - Fishbermi

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E38349	19/12/2023	Email	Outgoing	Link to website	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E39270	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 25165837 - Game Fishing Association of Victoria

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33515	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34227	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39271	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 268435495 - Game On Charters

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36386	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35168	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33516	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34228	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39272	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 25165828 - Gamefishing Association of Australia

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33517	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34229	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39273	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/RecreationEntity ID: 4881 - Go Surf School

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36393	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35179	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33528	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34240	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39274	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/RecreationEntity ID: 268435498 - Gone Fishing Charters

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36394	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35180	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33529	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34241	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39275	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/RecreationEntity ID: 1554 - Great Ocean Road Regional Tourism

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36398	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36399	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35185	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35187	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33535	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33537	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34247	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34249	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E38791	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39276	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 25165855 - Headland Fishing Charters

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E38345	19/12/2023	Email	Outgoing	Link to website	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E39277	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 5012 - King Island Boat Club

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36418	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35221	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33561	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34274	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39278	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 4725 - King Island Regional Development Organisation

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36429	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35228	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33567	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34280	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38999	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 4750 - King Island Surf Safaris

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36433	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35235	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33573	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34286	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39279	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

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Tourism/Recreation Entity ID: 4737 - King Island Tourism/Visitor Information Centre

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36434	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35236	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33574	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34287	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39280	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 4743 - King Island Tours

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36435	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35237	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33575	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34288	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39281	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 268435501 - Lakes Entrance Offshore Charters

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36436	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35240	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33578	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34291	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39282	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 268435502 - Long Jetty Prom Cruises

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36446	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35256	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33594	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34307	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39283	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Tourism/Recreation Entity ID: 8388634 - Mersey Yacht Club

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36456	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35269	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33608	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34322	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39284	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 1005 - Ocean Racing Club of Victoria

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36468	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36469	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36470	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35287	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35288	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35289	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33629	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33630	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33631	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34343	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34344	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34345	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39285	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39286	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39287	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 268435465 - Outthere Outdoor Activities

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36481	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35308	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33655	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34369	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34607	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39288	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/RecreationEntity ID: 268435466 - Pioneer Kayaking

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36501	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35333	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33680	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34394	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39289	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/RecreationEntity ID: 1649 - Port Campbell Boat Charters

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36502	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35336	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33683	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34397	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39290	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/RecreationEntity ID: 1660 - Port Campbell Visitor Information Centre

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36516	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35352	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33699	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34413	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39291	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/RecreationEntity ID: 268435541 - Port Fairy Angling Club

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33701	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34415	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39292	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 239075495 - Port Fairy Yacht Club

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36520	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35355	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33703	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34417	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39293	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 239075492 - Portland SCUBA

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36524	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35359	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 239075459 - Portland Sport Fishing Club

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36525	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35360	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33708	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34422	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39294	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 239075493 - Portland Yacht Club

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36527	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35358	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33707	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34421	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39164	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 268435503 - Pro Red Fishing Charters

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36528	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35362	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33710	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34424	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39295	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 268435504 - Pro-line Fishing Charters

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36529	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35363	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33711	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34425	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39296	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 25165852 - Recreational Fishing Alliance of NSW

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E38342	19/12/2023	Email	Outgoing	Link to website	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E39298	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 25165854 - Reel Affair Fishing Charters

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E38344	19/12/2023	Email	Outgoing	Link to website	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E39299	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 268435505 - Reel Time Fishing Charters

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36532	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35367	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33718	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34432	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39300	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/RecreationEntity ID: 8388633 - Royal Yacht Club of Tasmania

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36535	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35374	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33725	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34439	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39301	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/RecreationEntity ID: 268435506 - Salty Dog Charters

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36536	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35376	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33727	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34441	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39302	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/RecreationEntity ID: 25165853 - Sapphire Coastal Cruises

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E38343	19/12/2023	Email	Outgoing	Link to website	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E39303	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/RecreationEntity ID: 1007 - SCUBA Divers Federation of Victoria

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36540	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36541	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36542	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35382	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35383	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35384	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33734	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33735	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33736	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34448	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34449	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34450	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39304	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39305	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39306	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/RecreationEntity ID: 268435507 - Sea Myth Fishing Charters

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36547	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35387	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33739	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34453	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39307	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/RecreationEntity ID: 4194593 - Sharkmen Charters

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36550	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35399	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33752	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34466	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39308	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/RecreationEntity ID: 268435513 - South Gippsland Yacht Club

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36552	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35404	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33757	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34473	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39309	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/RecreationEntity ID: 268435509 - South West Fishing Charters

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36553	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35405	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33758	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34474	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39310	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/RecreationEntity ID: 268435508 - Southern Coast Charters

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36572	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35415	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33766	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34482	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39311	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/RecreationEntity ID: 25165857 - Southwest Expeditions

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E38351	19/12/2023	Email	Outgoing	Link to website	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E39312	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/RecreationEntity ID: 268435467 - Spindrift International Guiding

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36573	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35417	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33768	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34484	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39313	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/RecreationEntity ID: 1015 - TARFish

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36596	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36597	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35443	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35444	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33790	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33791	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34506	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34507	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39314	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39315	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/RecreationEntity ID: 268435510 - Think Big Fishing Charters

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36601	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35466	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33812	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34529	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39316	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/RecreationEntity ID: 1708 - Timboon Recreational Fishing Club

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36606	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35471	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33817	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34534	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39317	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 4194361 - VR Fish

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36624	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36625	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36626	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35496	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35497	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35498	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33843	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33844	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33845	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34560	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34561	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34562	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39318	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39319	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39320	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 25165836 - Warrnambool Offshore & Light Game Fishing Club

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33851	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34569	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39321	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 239075413 - Warrnambool Visitor Information Centre

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36633	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35508	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33854	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34572	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39322	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 4782 - Warrnambool Yacht Club

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36636	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35511	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33857	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34575	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39323	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Tourism/Recreation Entity ID: 268435468 - Wildlife Coast Cruises

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36652	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35530	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33874	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34592	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34884	23/11/2023	Beach Web Site			Project update - general	Requested consultation Incoming feedback via' Engage Beach'. Interested to understand what data we use for our whale management plans.	N/A no objections or claims made	N/A no objections or claims made	
E36750	27/11/2023	Email	Outgoing		Project update - locations	Requested consultation	N/A no objections or claims made	N/A no objections or claims made	
E37337	6/12/2023	Email	Outgoing		Project update - locations	Requested consultation Follow up	N/A no objections or claims made	N/A no objections or claims made	
E38642	20/12/2023	Email	Incoming		Project update - locations	Acknowledgement of Beach email	Relevant matter Interested in understanding what data could be shared.	N/A no objections or claims made Beach called and left a message.	
E39325	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received Consultation in the course of preparation of the EP has been completed in accordance with the OPPGS (E) Regulations. Beach engages in ongoing consultation during the implementation of this EP and Relevant Persons can provide feedback to Beach on	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
						any new relevant matters that may emerge. Beach will assess any new matters and where appropriate, Beach will apply its Management of Change Standard (section 8. 3.4.).			

Engagement Summary
"OGV Drilling P and A"

25(1)(e) Any other person or organisation that the titleholder considers relevant

Business Entity ID: 1471 - Australian Energy Producers

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36231	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34959	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33313	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34018	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39135	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 4194736 - Australian Oceanographic Services Pty Ltd

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36230	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34958	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33312	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34017	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38726	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 1508 - ConocoPhillips

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36270	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35025	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35543	16/08/2023	Email	Incoming		Project update - general	Acknowledgement of Beach email Requested to continue to receive info.	N/A no objections or claims made	N/A no objections or claims made	
E34082	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34598	21/11/2023	Email	Incoming	Link to website	Project update - general	Requested consultation Requested webinar registration details	N/A no objections or claims made	N/A no objections or claims made	
E34601	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received Webinar details sent.	N/A no response received	N/A no response received	
E38733	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 1509 - Cooper Energy

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36280	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35035	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33956	20/11/2023	Email	Incoming	Link to website	Project update - locations	Requested consultation Requested to register for webinars.	N/A no objections or claims made	N/A no objections or claims made	
E33954	20/11/2023	Email	Outgoing	Link to website	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34093	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38744	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 293601289 - Extent

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33494	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34206	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38746	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 1545 - Frying Nemo Fish and Chips

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36384	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35167	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33514	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34226	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38747	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 1553 - Grassroots Deli Cafe

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36395	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36396	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35181	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33530	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34242	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38748	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 1556 - Great Ocean Road Tourist Park

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36400	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36401	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35188	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33538	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34250	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38749	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 1601- Lochard Energy

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36438	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35248	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33586	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34306	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38759	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 1639 - Peterborough General Store and Takeaway Food

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36491	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36492	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35323	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33670	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34384	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38762	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 1640 - Peterborough Golf Club

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36493	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36494	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35324	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33671	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34385	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E38763	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 1641 - Peterborough House

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36495	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36496	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36497	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36498	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35325	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35326	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33672	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33673	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34386	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34387	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38764	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38765	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 1642 - Peterborough Licensed grocers

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36499	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36500	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35327	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33674	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34388	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38766	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 1652 - Port Campbell Hotel

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36504	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36505	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35338	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33685	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34399	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38767	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 1658 - Port Campbell Take Away

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36512	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36513	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35350	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33697	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34411	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38768	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 1659 - Port Campbell Trading Co.

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36514	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36515	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35351	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33698	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34412	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38769	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 1661 - Port Central Apartments

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36517	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36518	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35353	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33700	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34414	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38770	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 1662 - Port O' Call Motel

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36521	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36522	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35356	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33704	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34418	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38771	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 4433 - REAL Pizza Pasta Salads

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35366	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33716	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34430	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38772	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 1676 - Schlumberger Australia Pty Ltd

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36537	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35380	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33732	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34446	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38774	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 1679 - Sea Foam Villas Port Campbell

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36543	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36544	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36545	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36546	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35385	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35386	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33737	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33738	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34451	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34452	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38776	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38777	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 205520905 - South West Regional Executive Forum

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36554	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36555	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36556	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36557	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36558	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36559	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36560	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36561	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36562	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36563	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36564	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36565	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36566	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36567	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36568	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36569	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35066	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35406	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35407	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35408	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35409	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35410	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35411	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35412	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33416	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33759	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33760	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33761	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33762	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33763	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33764	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33765	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34124	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34475	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34476	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34477	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34478	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34479	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34480	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34481	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38779	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38781	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38782	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38783	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38784	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38785	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38786	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38787	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 1699 - TGS (previously Spectrum Geo)

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36600	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35465	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33811	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34528	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38788	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 1730 - Waves Cafe, Bar and Restaurant

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36645	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36646	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35519	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33862	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34580	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38795	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Business Entity ID: 293601290 - Wessex Archaeology

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33866	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34584	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38796	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commercial Fishing Entity ID: 1547

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations

Commonwealth Government Entity ID: 8388625 - Australian Border Force - Maritime Border Command

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36212	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34942	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33297	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34002	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38897	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commonwealth Government Entity ID: 988 - Australian Communications and Media Authority

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36216	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34946	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33301	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34609	21/11/2023	Email	Incoming	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34005	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34006	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38898	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38899	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Commonwealth Government Entity ID: 8388630 - National Offshore Petroleum Safety Environment Management Authority (NOPSEMA)

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36465	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35284	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33626	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34340	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38926	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
Community Entity ID: 79691781									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35130	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33482	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34194	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38928	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
Community Entity ID: 4920 - Life Saving Victoria									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35247	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33585	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34298	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38935	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
Community Entity ID: 268435539									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33647	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34361	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38941	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
Community Entity ID: 268435548 -									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33648	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34362	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38942	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
Community Entity ID: 1633 - Otway Gas Plant Community Reference Group									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35090	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33363	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34368	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38949	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Community Entity ID: 1644 - Peterborough Residents Association

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34908	14/07/2023	Email	Incoming	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34909	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35328	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35329	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35330	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35331	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33675	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33676	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33677	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33678	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34389	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34390	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34391	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34392	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38951	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38952	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38953	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38954	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Community Entity ID: 1648 - Port Campbell Board Riders Association

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35335	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33682	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E34396	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38955	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Community Entity ID: 1656 - Port Campbell Rifle Range

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E35345	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35346	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33692	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33693	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34406	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E34407	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38958	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38959	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

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Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations

Land Holder Entity ID: 1497

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36258	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36259	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E36260	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E35013	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35014	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E35015	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33362	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34070	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E38950	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39022	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement Summary
"OGV Drilling P and A"

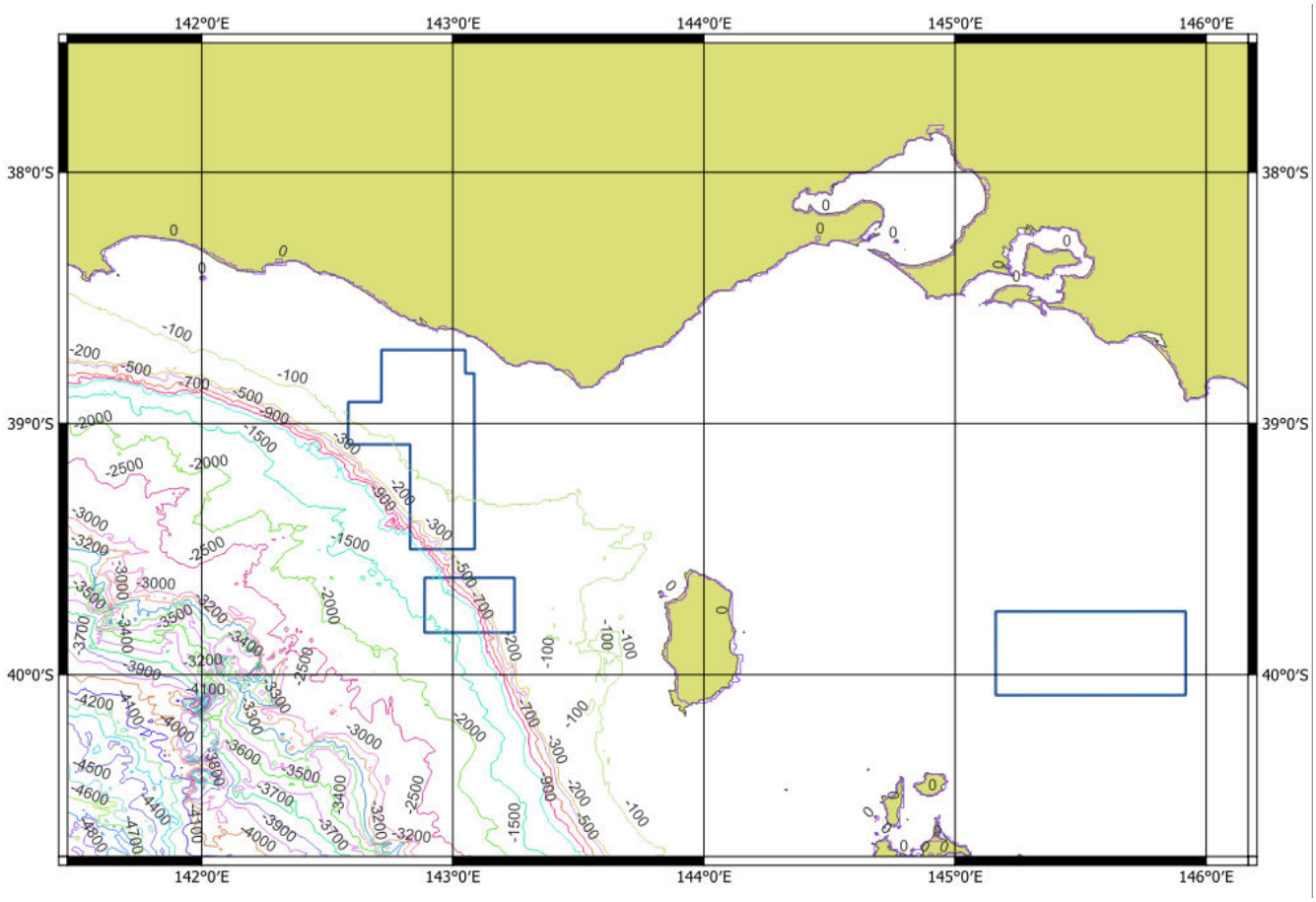
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39023	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
Marine Based Industries Entity ID: 1453 - 3D Oil Ltd									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36201	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34913	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33270	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33271	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33976	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39133	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39134	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
Marine Based Industries Entity ID: 155189265 - Beach Energy									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E39140	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
Tourism/Recreation Entity ID: 4937 - Apollo Bay Fishing and Adventure Tours									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E36204	29/05/2023	Email	Outgoing	Info sheet	Project introduction	N/A no response received	N/A no response received	N/A no response received	
E34932	14/07/2023	Email	Outgoing	Info sheet	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E33287	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E33992	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39262	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
Tourism/Recreation Entity ID: 25165829 - RecFish West									
Engagement ID	Date	Engagement Type	Direction	Attachments provided	Summary of correspondence sent	Summary of each response by relevant person	Assessment of merits of objection or claim about adverse impacts of EP activity	Titleholder response to objection or claim	Measures adopted or proposed because of consultations
E33717	14/11/2023	Email	Outgoing	Link to website	Project update - locations	N/A no response received	N/A no response received	N/A no response received	
E34431	21/11/2023	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	
E39297	8/01/2024	Email	Outgoing	Link to website	Project update - general	N/A no response received	N/A no response received	N/A no response received	

Appendix B SETFIA Commercial Fishing Data Report

COMMERCIAL FISHERIES DATA

Overlapped by Beach Energy's Otway and Bass Basin Sites



CLIENT: **Beach Energy Limited**

NAME:

DATE: **14 November 2023**

CLIENT MANAGER: **SETFIA**

VERSION: **FINAL**

SETFIA
SOUTH EAST TRAWL FISHING INDUSTRY ASSOCIATION
sustainable fishing practices protect our future

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EXECUTIVE SUMMARY

Background

BEACH ENERGY LIMITED is an oil and gas exploration and production company with oil and gas production in five basins across Australia and New Zealand including the Otway and Bass basins in south-east Australia. BEACH ENERGY LIMITED also has a suite of exploration permits including one offshore the Otway Basin.

SETFIA represents stakeholders in the Commonwealth managed fishery called the *Commonwealth Trawl Sector* (CTS). The fishery is the largest supplier of local finfish in Australia. SETFIA has completed four previous commercial fishing projects for BEACH ENERGY LIMITED's operations in the Otway and Bass basins as well as a number of SMS fishing vessel notification campaigns.

BEACH ENERGY LIMITED have engaged SETFIA on previous occasions. Previous projects have focused only on CTS and shark fishery data and have considered the risk of fishing gear types *assumed* to be used in areas of interest.

BEACH ENERGY LIMITED has in this instance requested fishery data from all fisheries in the area – Commonwealth, Tasmanian and Victorian (not just the CTS) and insight on the amount and value of fishing being caught in the area by all these fisheries. This includes the frequency of fishing operations and the seasonality of fishing operations (if any). Further, the scope of this current project includes a risk analysis and fishing gear types confirmed as being used in the area.

For the purposes of this report Beach's areas-of-interest (AOIs) are divided into three logical and self-explanatory divisions called *North Otway, South Otway, and Bass Coast (*Figure 1*).*

Fishery overlap

The number of fisheries overlapping each AOI are;

- seven active fisheries in the North Otway AOI (three Commonwealth and four Victorian)
- six in the South Otway (three Commonwealth, two Victorian and one Tasmanian)
- seven in the Bass Coast (four Commonwealth and three Tasmanian).

Data confirms that there are eleven different Commonwealth, Victorian and Tasmanian fisheries in the three AOIs and that they use ten different types of fishing gear. These are detailed in Table 3 and the fishing gears they use in Table 10.

Three Commonwealth fisheries are common to all three AOIs; they are the CTS, the Gillnet Hook and Trap (GHaT) (shark fishery) and the Southern Squid Jig (SSJF).

The annual average total catch and revenue from commercial fisheries overlapped by the three AOIs is:

- North Otway 54 tonnes, $1.05m (higher values driven by Victorian Rock Lobster)
- South Otway 21 tonnes, $214,000.
- Bass Basin 14 tonnes, $130,000.

Catches, revenues, and other metrics for these fisheries are set down in Table 2.

General information on the fisheries present is set down in Section 3 COMMERCIAL FISHING – GENERAL INFORMATION.

Only the Victorian crab fishery has a very strong overlap of 81% in the North Otway and 61% in the South Otway with other fisheries not significantly overlapped. However, there are significant catches of Victorian Rock Lobster and Abalone in the North Otway AOI. It is likely that abalone fishing occurs at the northern boundary of that AOI.

Seasonality

Seasonality data is only reportable for Commonwealth fisheries due to the nature in which data is provided by State management bodies. However, two the Tasmanian and Victorian-managed Giant Crab and Rock lobster fisheries have open and closed seasons:

Table 1 Seasonality of active fisheries in the three AOIs

Fishery	**Male season open**	**Female season open**
Victorian Rock lobster fishery	16 November to 14 September	16 November to 30 May
Victorian Giant Crab fishery	16 November to 14 September	16 November to 30 May
Tasmanian Rock lobster fishery	Varies see link here	
Tasmanian Giant Crab fishery	All year	15 November to 31 May

The seasonality of the gillnet, hook and shark (GHaT) fishery varies between AOIs, the North Otway AOI has consistent catch across spring, summer and autumn with lower catches in winter, this is the opposite in the Bass Coast AOI where winter yields the highest catch, summer the lowest and spring and autumn in the middle. The South Otway is like the North with the lowest catch in the winter, however, spring through autumn is more varied with summer providing the highest catch. There is a greater change in the shark fishery between moons than there is a seasonal difference.

Seasonality for the CTS is only reportable in the Otway region due to low vessel numbers in the Bass Coast. Additionally, autumn in both the North and South Otway is also confidential due to less than five vessels in the data. However, the seasonal analysis winter through summer shows that winter is the highest catch season for the North Otway with lower (approx. half) catch in spring and summer. In South Otway winter has similar catch to summer, where spring sees the highest catch for the fishery. Generally the seasonality of the CTS is that a few (of 15) board trawl vessels will fish eastern orange roughy and spawning blue grenadier in winter (June and July) and will focus on mixed species at all other times.

The North Otway AOI is the only area where seasonality can be reported for SSJF due to confidentiality. The mean annual catches were much higher in winter than autumn, and no catches were reported in the spring season, data is not presented for summer as catches were reported by fewer than 5 fishers.

The mean annual catch for winter was 10 tonnes and no scallops were caught in summer or autumn. Seasonal catch data is not provided for spring as catches were reported by fewer than 5 fishers. Scallop season in Victoria generally runs between July and December and is driven by scallop condition (yield).

Trawl tracks

The Portland based trawl vessel *Moira Elizabeth* provided a selection of trawl tracks near the two Otway AOIs for the purposes of this report. However, much the same as previous processes the sample size of a single vessel shows where that vessel fishes but does not reliably indicate that other vessels do not fish elsewhere. This chart is not shown because as best it is misleading.

To overcome this the Project has developed a new type of analysis for this report. Data provided by AFMA includes the start position of every trawl fishing operation (shot) for 20 years. Mapping software allows for this data to be gridded in a heat map of fine resolution grids. Given that this methodology may not pass AFMA's five boat test the project made written application to AFMA about the use of this data and they have approved it released by a request that it not be released publicly. Termed a '*blur analysis*' this the finest scale analysis ever undertaken by SETFIA and has huge potential value if there is flexibility in the positioning of wellheads and petroleum safety zones.

The blur analysis is shown for trawl (CTS) in Figure 20 and for all Commonwealth methods combined in Figure 21 (note the confidential watermark requested by AFMA indicating that this cannot be redistributed). It reveals that the CTS and all other Commonwealth fishing generally occurs been 400m and 1,000m meaning that the south-west corner of the North Otway AOI is somewhat exposed to Commonwealth fishing but that the middle of the South Otway AOI is very exposed. Given GHaT shark fishing does not occur deeper than 183m, it is likely that the data presented is from the CTS, the SSJF and various GHaT hook methods.

Relative Risk

The work completed for BEACH ENERGY LTD in July 2021 estimated eight relevant fishing gear types. The data obtained now indicates that there are nine gear types of fishing gear present, they are (in alphabetical order).

1. Danish Seine.
2. Demersal gillnet.
3. Demersal longline.
4. Dredge (scallop).
5. Demersal trawl.
6. Jig (squid).
7. Hand gathering (diving).
8. Handline.
9. Pots/traps (cray, GHaT fish trap and Giant Crab).

The July 21 report considered crab/rock lobster pots and traps separately but within this new report they are considered as the same gear type given their similarities. Thus, this new analysis has added handline and hand gathering to the list of methods present.

The risk review (Table 12) considers five forces: vessel impact, anchor drop, anchor drag, fishing gear drop and the pulling force of snagged gear recovery. Some gear types are not relevant for each force, for instance diving and jigging do not use fishing gear that might fall onto oil/gas infrastructure. A score of 1.00 is assigned to the gear type involved with the greatest forces (demersal trawling) with all other fishing gears the scored as a fraction of this. Each then receives a relative ranking based on the sum of these five scores. It is important to note that trawling's risk score of 5.00 does not mean it is twice as risky or impactful as scallop dredging which score 2.58. Rather, that the sum of scallop dredging's forces is about half that of trawling. The five occurrences will generally not occur together so adding horizontally across Table 12 is meaningless. The table's use is in considering the most forceful fishing method, and the actual forces present, which is all cases is demersal trawling.

Relative gear risk can be broadly grouped into three natural categories:

1. Higher relative risk (1 and 2): Demersal trawling and scallop dredging involve larger forces.
2. Moderate relative risk (3 through 7): Pots/traps, demersal gillnets, (squid) jigging, Danish seine and demersal longline.
3. Low relative risk: Handline and hand gathering are low relative risk gears (ranked 8 and 9), so their addition to this report does not significantly change the risk profile.

The report does not draw a line of acceptable risk and notes all wellheads are protected by PSZs but that pipelines are not.

Discussion:

Section 5 explains the nature of the commercial fishing's industry's property rights and how the loss of grounds reduces the profitability of fishing businesses and in doing so impairs (reduces) the asset values of access and quota rights. The issue for BEACH ENERGY LTD is not so much direct displacement of the fishing industry given their footprint is relatively small. For instance, a 500m exclusion around a wellhead PSZ equates to only 0.2km^2. In the context of potentially 7,000km^2 offshore windfarm feasibility licences being granted in the next 3-24 months across southern-eastern Australia, BEACH ENERGY LTD's activities are minor. Rather's BEACH'S dilemma is its small contribution to the cumulative complexity that many shared marine space developments present to the fishing industry.

Four themes have emerged in a changing marine economy:

1. The complexity and risk (both to fishing and new marine activities) of fishing around multiple shared marine space projects.

2. The cumulative impact of multiple shared marine space ingressions into traditional fishing grounds.

3. Fishing stakeholder consultation fatigue. This is important given NOPSEMA's direction to Proponents for greater consultation following the Barossa offshore gas development court case and more recently the Scarborough seismic environment plan court case.

4. The need for the fishing industry to have the rights to the grounds provided to it by States and the Australian Government recognised by new marine space projects (even small ones).

The recommendations made consider these four themes, the fisheries present and their relative risk.

Recommendations:

A. Consultation for works occurring with an existing PSZ (already closed to fishing) should be the minimum possible and to industry associations (Table 13) rather than fishers and other stakeholders. Direct written communication with vessel permit holders is ineffective given; permit holders only represent a fraction of the fishing stakeholders by number and investment value, fisheries are often geographically very large (the CTS trawl fishery spans four states) meaning most fishing stakeholders will have no interest, and vessel permits are often leased meaning the correspondence never reaches an on-the-water "fisher".

B. The most impacted fisheries are Victorian Rock Lobster and Victorian Giant Crab, and focus should be placed on them. These fisheries are currently in very different positions and BEACH ENERGY LTD should be mindful of the position of each when discussing what are relatively very minor additional impacts:

- The Rock Lobster fishery relied heavily on a high value live export market to China. This was shut down in 2020 when China applied an import ban following comments by the Australian Government about the origin of Covid and other underlying tensions. The Victorian rock lobster fishery is also potentially very impacted by the proposed Southern Ocean marine windfarm zone. The potential for displacement by the proposed windfarm zone has increased following a recent announcement by the South Australian Premier that they do not want the zone to extend into waters off South Australia increasingly the likelihood that it will be placed further east.

- The Giant Crab fishery avoided the import ban into China with demand and price remaining very strong. But the fishery has been plagued by reducing catch rates and therefore reduced TACs. TACs have halved in the last decade. Giant crab stock assessment science is complicated by a lack of age data (i.e how long do they live?) because unlike other animals with hard body parts that show seasonal growth rings, crabs periodically shed their shells. Two significant marine seismic surveys are planned in the Otway Basis in 2024-25 (CGG and TGS) and these will significantly impact the Victorian Giant Crab fishery.

C. Efforts should be made to work with the Commonwealth fishery (SSIA and SETFIA) and to possible avoid placing a wellhead in the fishing grounds identified in the blur analysis in the South Otway AOI (Figure 20 and Figure 21).

D. If (C) above is unavoidable then fishers may be due compensation and BEACH ENERGY LTD should develop a policy on this. Of note is that all marine windfarm developers have accepted that they will pay compensation for displaced fishing and impaired quota rights (albeit far more than the displacement caused by BEACH ENERGY LTD).

E. Given the loss of fishing grounds that is occurring at an unprecedented rate BEACH ENERGY LTD should be mindful of the pressures on-the-water fishers face in ensuring they avoid these projects, particularly PSZs. These efforts should consider and perhaps be proportional to, the relative risks of fishing gears set down in Table 12. BEACH ENERGY has already contracted SETFIA's vessel SMS service which covers multiple fisheries in western Victoria. Some eastern oil/gas companies undertake a period risk assessment that considers crew changes, technology changes on vessels and the loss of fishing grounds. Beach might consider the same for the CTS and scallop fishery. New navigational aide technology is emerging, and BEACH ENERGY might consider a project to investigate this.

PROJECT AREA

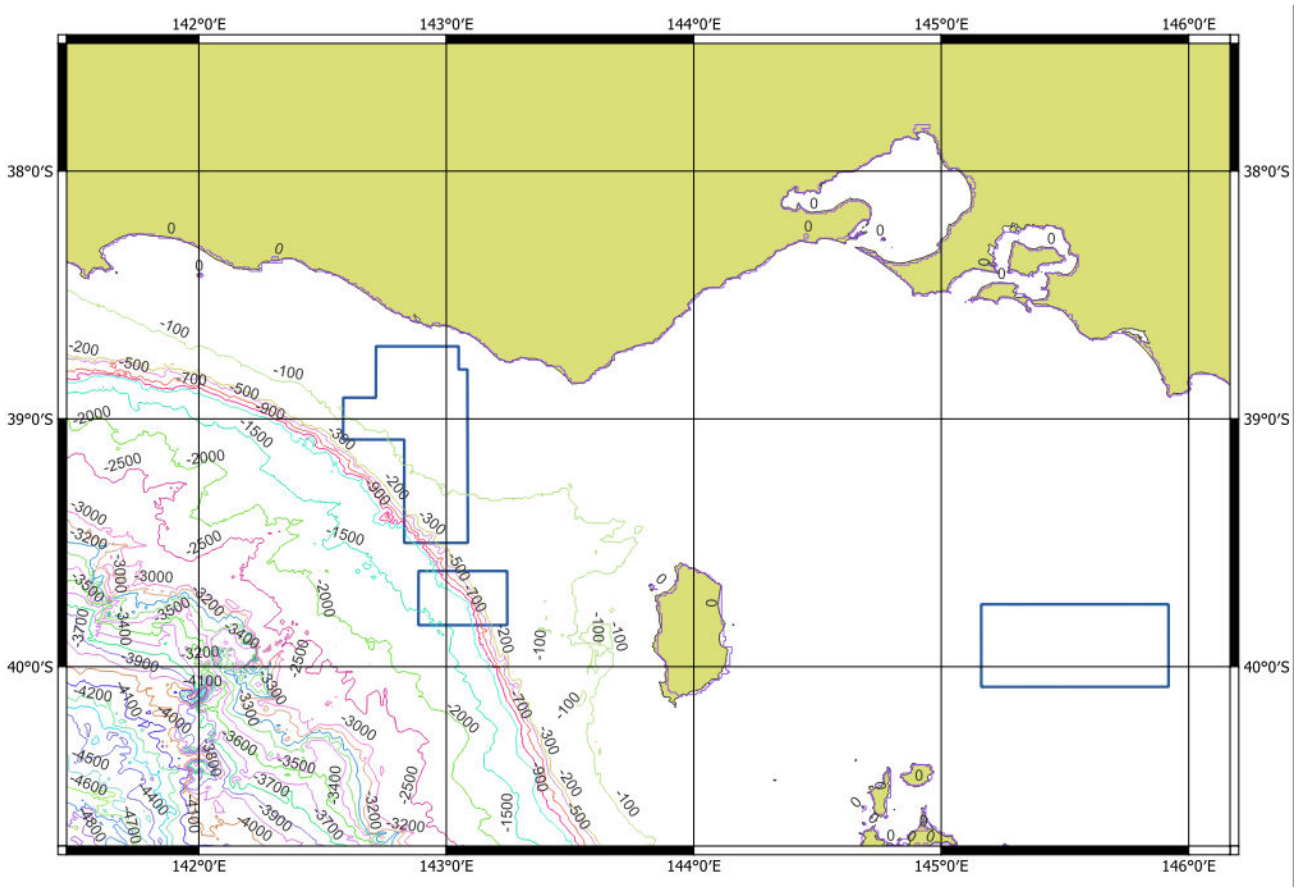

Figure 1. The three areas of interest (blue) and 100 m bathymetry.

Table 2. Fisheries overlapping within the three Beach AOIs: annual average (1/7/2002 to 30/6/2023, where available) catch and revenue, recent total allowable catch (TAC), recent total catch (2021-22, unless otherwise specified) and % of catch. Fisheries are ordered by value.

				North Otway				South Otway				Bass Coast			
Fishery	Jurisdiction	Fishery TAC (tonnes)	Fishery catch most recent year (tonnes)	Av. annual catch (tonnes)	Av. annual catch per 100km2 (tonnes)	% of Fishery catch from area	Av. annual revenue from area (million AUD)	Av. annual catch (tonnes)	Av. annual catch per 100km2 (tonnes)	% of Fishery catch from area	Av. annual revenue from area (million AUD)	Av. annual catch (tonnes)	Av. annual catch per 100km2 (tonnes)	% of Fishery catch from area	Av. annual revenue from area (million AUD)
Rock Lobster	Victoria	249[1]	252[1]	10.8	0.2	4.2%	$0.38 m	0.47	0.03	0.2%	$0.02 m	*NA*	*NA*	*NA*	*NA*
Abalone (Central Zone)	Victoria	251[1]	241[1]	7.2	0.13	3%	$0.26 m	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*
Giant Crab (western zone)	Victoria	12[1]	19[1]	7.3	0.14	81%	$0.14 m	5.5	0.35	61%	$0.1 m	*NA*	*NA*	*NA*	*NA*
Gillnet, Trap, and Hook Fishery (GHaT)	C'wealth	2,555[2]	1,744[3]	15.8	0.62	0.9%	$0.13 m	7.6	1.01	0.43%	$0.06 m	9.0	0.4	0.5%	$0.08 m
Bass Strait Central Zone Scallop Fishery	C'wealth	3,000[4]	2,732[4]	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	4.7	0.2	0.17%	$0.01 m
Southern Squid Jig Fishery (SSJF)	C'wealth	NA	487[5]	9.5	0.37	3.1%	$0.12 m	*Confidential*	*Confidential*	*Confidential*	*Confidential*	*Confidential*	*Confidential*	*Confidential*	*Confidential*
Commonwealth Trawl Fishery (CTS)	C'wealth	29,114[6]	17,315[7]	3.8	0.15	0.02%	$0.02 m	7.8	1.05	0.05%	$0.03 m	*Confidential*	*Confidential*	*Confidential*	*Confidential*
Ocean (General)	Victoria	NA	NA	*Confidential*	*Confidential*	*Confidential*	*Confidential*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*
Scalefish Fishery	Tasmania	NA	292.9[8]	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	7.5	0.31	2.5%	$0.04 m
Rock Lobster Fishery	Tasmania	1,051[9]	1,031[10]	*NA*	*NA*	*NA*	*NA*	0.01	<0.01	<0.01%	<$0.01 m	0.03	<0.01	<0.01%	<$0.01 m
Giant Crab Fishery	Tasmania	21	15.2[11]	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*Confidential*	*Confidential*	*Confidential*	*Confidential*
TOTALS				**54.4**	**2.14**	**0.46%**	**$1.05 m**	**21.4**	**2.9**	**0.1%**	**$0.21 m**	**13.7**	**0.88**	**<0.01%**	**$0.13 m**

[1] For 2021-22. https://vfa.vic.gov.au/__data/assets/pdf_file/0003/940143/VFA-Commercial-Fish-Production-Information-Bulletin-2021~22.pdf
[2] For 2022/2023. Main shark species only (Elephantfish, Gummy Shark, Sawshark, School Shark) – excludes finfish and deepwater shark TACs.
[3] For 2021/2022. 281 t of sharks caught by other fisheries.
[4] For 2020. https://www.afma.gov.au/fisheries/bass-strait-central-zone-scallop-fishery#
[5] For 2021. https://daff.ent.sirsidynix.net.au/client/en_AU/search/asset/1034121/13
[6] For 2022–2023. Finfish and deepwater shark only – excludes main shark (Elephantfish, Gummy Shark, Sawshark, School Shark) TAC.
[7] For 2021–2022. 562 t of fish caught by other fisheries.
[8] For 2019-2020 https://www.imas.utas.edu.au/__data/assets/pdf_file/0003/1543728/Scalefish-Assessment-2019-20_Final_Figures_Revised4.pdf
[9] For 2023–2024 https://fishing.tas.gov.au/commercial-fishing/commercial-fisheries/rock-lobster-fishery
[10] For 2022-2023 https://fishing.tas.gov.au/commercial-fishing/commercial-fisheries/rock-lobster-fishery/rock-lobster-catch-updates
[11] For 2020 https://tasfisheriesresearch.org/gc/catch/

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GLOSSARY

Abbreviation	Explanation
AFMA	Australian Fisheries Management Authority
AOI	Area of Interest
ASX	Australian Stock Exchange
BSCZSF	Bass Strait Central Zone Scallop Fishery
CFA	Commonwealth Fisheries Association
DPI	Department of Primary Industries
FAD	Fishing Aggregation Device
GAB	Great Australian Bight fishery
GHaT	Gillnet, hook and trap fishery
NSW	New South Wales
OTLF	Ocean Trap and Line Fishery (NSW)
OTF	Ocean Trawl Fishery (NSW)
PFA	Professional Fishers Association (NSW)
PSZ	Petroleum Safety Zone
RFA	Recreational Fishing Alliance (NSW)
RFL	Recreational Fishing Licence
RFMP	Recreational Fisheries Monitoring Program
SETFIA	South East Trawl Fishing Industry Association
SESSF	Southern and Eastern Scalefish and Shark Fishery
SIA	Seafood industry Australia
SSJF	Southern Squid Jig Fishery (Commonwealth)
SSIA	Southern Shark Industry Alliance
TAC	Total Allowable Catch
VFA	Victorian Fisheries Authority
VMS	Vessel Monitoring System

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PROJECT DESCRIPTION

Background

BEACH ENERGY LIMITED (Beach) is an ASX listed, oil and gas exploration and production company headquartered in Adelaide, South Australia. Beach currently has oil and gas production in five basins across Australia and New Zealand and is a key supplier of gas into the Australian East Coast gas market. Beach's asset portfolio includes ownership interests in strategic oil and gas infrastructure and assets across Australia and New Zealand. Beach operates a world-class onshore oil business on the Western Flank of the Cooper Basin and has grown to become Australia's largest onshore oil producer. In addition to its producing assets, Beach has a suite of exploration permits across the onshore Cooper and Perth basins, onshore and offshore Otway Basin as well as offshore acreage in the Bonaparte (Australia) and Taranaki (New Zealand) basins.

Beach's purpose to '*sustainably deliver energy for communities*' means it operates while maintaining the highest health, safety, and environmental standards.

SETFIA represents stakeholders in the Commonwealth managed *Commonwealth Trawl Sector* (colloquially the *South East Trawl Fishery*). The fishery is the largest supplier of local finfish in Australia. Its boundaries run from north of Sydney, though Victoria and Tasmania to Cape Jervis just over the SA border. Through voluntary membership of almost 40 entities SETFIA members own 90% of the assets (quota and vessels) in the sector. SETFIA is incorporated under the Corporations Act, is not-for-profit, and governed by a non-remunerated Board elected by their peers from the membership's ranks.

Previous Projects

Beach has engaged SETFIA several times to assist it meet the objective stated in 0 and also to comply with relevant approval processes particularly the Offshore Petroleum and Greenhouse Gas Storage Act 2006. Some of this work overlaps so a summary of this previous work is useful:

1. A report reviewing information sheets about the *Otway Offshore Project Proposed Seabed Assessment Locations (2 July 2019)* focused on the La Bella field, Atrisan-1 and Geographe 5/4 sites that made several relatively minor recommendations about the communication and also spoke with six fishers and provided feedback from them.

2. A report titled *REPORT TO BEACH ENERGY ON TRAWL AND GILLNET FISHING ACTIVITY AROUND BEACH ENERGY'S PROPOSED OTWAY OFFSHORE PROJECT -1 November 2019.* The report focused on the La Bella, Geographe East/West, Artisan and Thylacine well heads and their pipelines. It used confidential fishing locations (tracks) obtained from trawl and gillnet vessels. The report did not draw data from fishery managers given project time constraints and therefore had several limitations:

   - Data was only obtained from four trawl vessels and one gillnet vessel and that it was possible that other sectors fished in the area.
   - The report concluded that none of the trawl vessels considered fished in the area, but reports have recently emerged that some trawl vessels do fish near this field.
   - The tracks provided by fishing vessels are highly confidential and cannot be reproduced for the purposes of an EP.
   - The report is not quantitative in terms of the amount of fishing occurring in/near the field.

3. A report titled, *Fisheries likely to operate in the area of Beach Energy's Otway Offshore Project and the Relative Risk they Present to Oil and Gas Infrastructure 6 July 2021*. This report considered the fishing methods identified in the November 2019 report (La Bella, Geographe East/West, Artisan and

Thylacine well heads and their pipelines) and then estimated the fisheries and fishing gear types likely to also be present.

The report *estimated* that there were seven fisheries managed by the Commonwealth and Victorian jurisdiction: (Commonwealth Trawl Sector (CTS) CW, Gillnet, Hook and Trap Sector (GHaT) CW, Squig Jig Fishery CW, Bass Strait Central Zone Scallop Fishery CW, Rock Lobster Fishery Vic, Giant Crab Fishery Vic, and the Octopus trap fishery Vic. And that these seven fisheries used seven different types of fishing gear, these being: demersal trawl, Danish seine, Scallop dredging, Gillnet, Cray & Gant Crab pots, demersal longline and jigging. These fishing gear types were assessed for the relative risk they presented to the field finding demersal trawl and scallop dredge to be most risky with other methods presenting far less risk. This report was also limited:

- There was no evidence to confirm that methods other than gillnetting and trawling were present so gear may have been considered that were not present and it is possible (although unlikely) that fishing gear types present in/near the field were omitted.
- The report is not quantitative in terms of the amount of fishing occurring in/near the field.

4. A report titled, *Commercial fishing catch and value in the Beach Energy Operational Area footprint 18 May 2020*. The report considered the fishing around Beach's Rockhopper, Trefoil, White Ibis, and Bass wellheads to the east of the Yolla wellhead. Commercial fishery data showed that six fisheries were active in the area caching on average annually ≈30 tonnes valued at ≈$154,000.

5. Three SMS vessel notification programs:

- May 2020 about Beach's operations around the Trefoil field.
- August 2021 about Beach's operations in the Prion field.
- March 2021 about Beach's seabed assessment operations using the Harvest Shine.

Scope and deliverables of this report

Beach has requested a new report relevant to the OGV Project which has a different spatial scope and timeframe to previous reports. The report needs to reflect the most recent fishing information as it will be reviewed against past information to understand any relevant large-scale trends.

The scope will also address limitations identified by SETFIA in previous work completed (1, 2 and 3). Specifically, significant gaps are present in that data from fisheries has never been considered even though the relative risk of fishing gear *estimated* to be present has been considered.

Beach has requested fishery data and insight on the amount and value of fishing being caught in the area, the frequency of fishing operations, and the seasonality of fishing operations (if any).

Therefore, the scope of work proposed includes:

1.1. To identify all fisheries permitted (holding rights) to work inside Beach's Otway and Bass basins, as shown on the previous maps.

1.2. After agreeing the area-of-interest with the Client the Contractor will submit data requests on fisheries regulators from Tasmania, Victoria, and the Commonwealth and then present aggregated[12] data for these yet to be determined areas of interest within the Otway and Bass basins. This is likely best presented by field but will be agreed with the client. This data will be presented in a table in approximate order of potential annual catch impact by fishery and jurisdiction:

[12] At the highest possible detail while maintaining compliance with Commonwealth, Victorian and potentially Tasmanian confidentiality rules. Some data may therefore not be available.

- number of fishers licensed to operate in the area (by fishery type)
- number of fishers who have operated in the area over the last three years
- seasonal (3 months) catch tonnes[12],
- annual catch tonnes[12],
- catch value[12],
- recent catch limits,
- recent catches[12],
- fishing effort[12] (days fished or fishing operations) and,
- metrics explaining the relative importance of the area.

1.3. A potential update of trawl tracks by merging the existing trawl track data held with that of the new vessels that have raised concerns that they do fish in the area.

And then to put this data analysis in perspective by:

1.4. Providing some general information about commercial fishing sectors identified in 1.1; vessel size, gear types, catches, fishing gears and methods.

1.5. After fishing gears present are confirmed the existing risk analysis will be re-presented. In the unlikely event that a new fishing gear type emerges the chapter's author Dr John Wakeford will expand the analysis.

1.6. Explaining the nature of commercial fishing industry property rights and how these are impacted by loss of productive fishing grounds due to the declaration of PSZs' and reduced prospectivity.

1.7. Discussing the project's overlap with commercial fishing in the context of the seasonality of these fisheries and their operations.

And finally, to make the next step clearer by:

1.8. Providing a comprehensive stakeholder list (with contact details) of associations representing all commercial fishing sectors identified in 1.1 (can fish in area).

1.9. Making recommendations for next steps including:

- Consultation on potential impacts and mitigation measures
- Further consultation with fishing associations and ways to facilitate

1.10. The scope of the work excludes:

- Consultation with the commercial fishing industry
- The recreational fishery
- Work on polygons additional and later than that agreed with the Client at the beginning of the Project.

METHODS

Fisheries data

Requests for commercial fishery catch and effort data requests were sent to the Australian Fisheries Management Authority (AFMA) for Commonwealth fisheries, the Victorian Fisheries Authority (VFA) and Department of Natural Resources and Environment Tasmania (Fishing Tasmania) for State managed fisheries. Information on the catch value per kilogram of green weight was obtained for each species from published reports, fishers or fisheries wholesalers where available.

Commonwealth fisheries data confidentiality

The format of the data and spatial resolution of fishing effort reporting differs between jurisdictions and fisheries. Commonwealth-managed fisheries report position by latitude and longitude, usually for each fishing operation (e.g. trawl fishing), or each day by location fished (e.g. scallop fishery). AFMA provides this "raw" data to Atlantis on the proviso that it be aggregated in accordance with the "5-boat rule"[13] for publication. After the final report, the data is then deleted.

Thus, the AFMA data were filtered to select records that overlapped with the HOWZ using the start or end fishing location. Data were then aggregated to as fine a level as possible so as not to break the "5-boat rule", but still be able to address the scope of the work. Raw catch and effort data were requested from all Commonwealth managed fisheries that reported effort in the area. Data fields requested included trip, shot and catch data by species for the time period 1/7/2002 to 30/6/2023.

A new type of analysis called a blur analysis was completed for this project (Figure 20 and Figure 21). AFMA have provided written authorisation for its use albeit with a confidential watermark and request that it is not published. This new analysis is explained in the Executive Summary.

State fisheries data confidentiality

In contrast to AFMA, the VFA and Fishing Tasmania usually require their fishers to record position by reporting grid (abalone divers for example record effort by reef code). Most Victorian fisheries report catch and effort by 10 x 10-minute grid areas (Figure 2). The VFA aggregates and filters data in accordance with the "5-boat-rule" before distributing it. Thus, data requests to the VFA and Fishing Tasmania were for catch and effort from any reporting grids that overlapped with the Beach Energy AOIs (Figure 2).

A range of Victorian fisheries are permitted to operate in the Beach Energy's AOIs (Table 3). but they may not necessarily actually fish in the area due to the size of the reporting grids. Because of the "5-boat rule", data requests submitted at too small a temporal or spatial scale risk being filtered to such coarse level of detail that it is not useful for informing a project such as this. Atlantis therefore requested data across the sum of all overlapping Victorian and Tasmanian reporting grids so that as much of the data could be included as possible, but it is aggregated in a way required by VFA and Fishing Tasmania confidentiality rules.

[13] Fisheries agencies have confidentiality policies that restrict making public data comprising of less than 5 vessels.

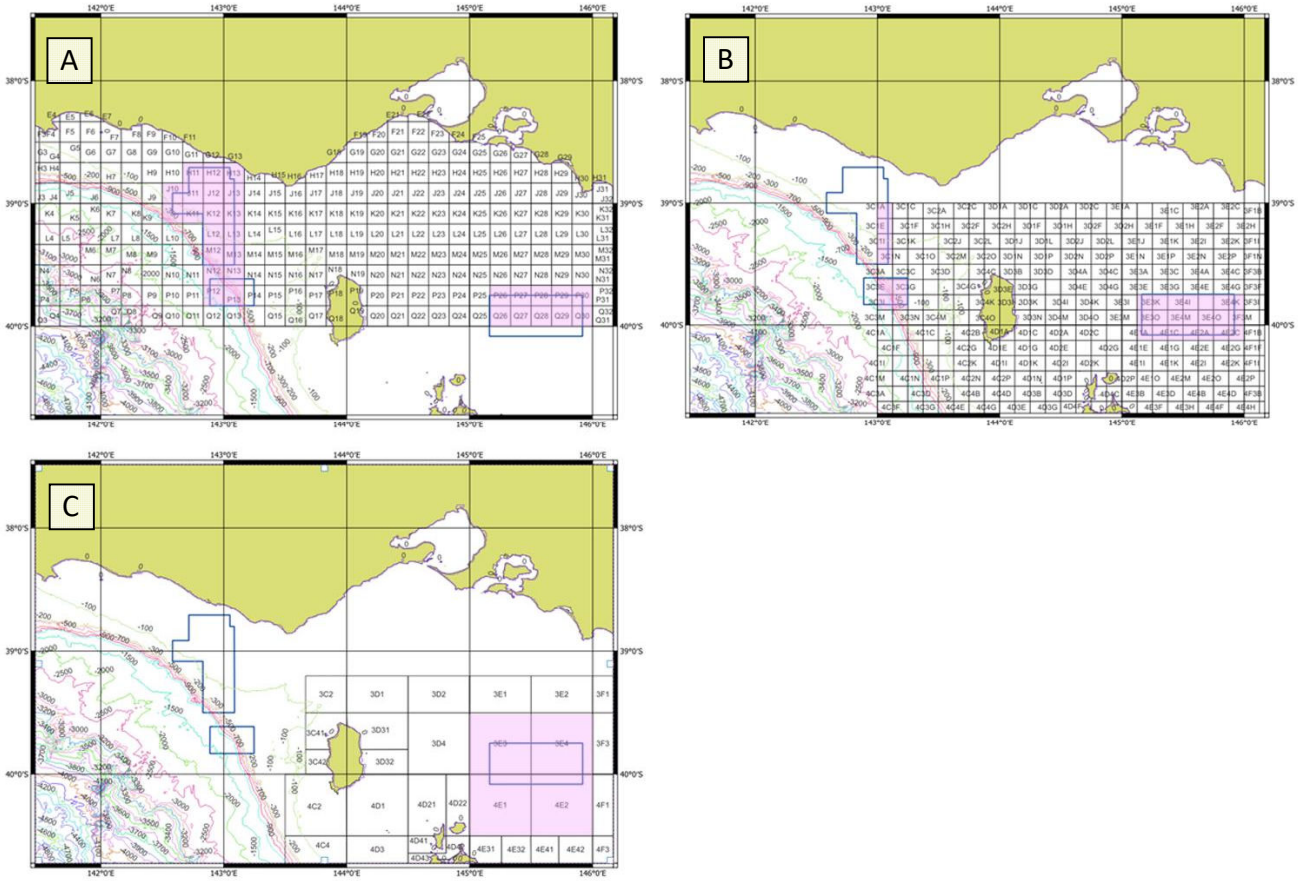


Figure 2. State reporting grids, A) Victorian, B) Tasmanian Rock Lobster and Giant Crab, and C) Tasmanian Scalefish. Pink grids represent those included in analysis.

Data treatment and assumptions

Given the methods used to filter data described above, we expect that data summaries to generally overestimate the catch and effort within the area of interest, but that the method used is appropriate for this project.

As explained Victorian and Tasmanian management agencies require catch reporting from fishers using reporting grids rather than the exact position of each fishing operation or day worked. As such, data from any reporting grid with any partial overlap with the area of investigation is stated.

Table 2 contains data for the value of catch overlapped by the area of interest. Catches by species (from fisheries data explained earlier) are multiplied by prices that are set down in Appendix A to produce overlapping revenue by fishery. Catch values were obtained from a range of sources including the Sydney Fish Market (whose assistance is appreciated), ABARES or directly from fishers and fishing cooperatives.

TERMINOLOGY

- The term "AOI" refers to the three areas-of-interest: North Otway, South Otway and Bass Basin.
- Within this report the term "catch" refers to catch of commercial value landed and excludes fish discarded at sea and not landed for sale.
- Fisheries are sometimes divided into management units for purposes of applying staff, cost accounting and for reasons of legislation. This report refers to these units as both *sectors* and *fisheries*.
- Some data is labelled "*confidential*" which means that there was catch but it was from less than five vessels in the dataset, and it cannot therefore be presented. Special treatment has been given to a new blur analysis – this is explained in the Executive Summary.
- For the purposes of this report, the potential "*impact*" is calculated as the overlap with each of the three AOIs and the reported location of retained commercial catch.

1. COMMERCIAL FISHING & BEACH ENERGY

1.1 Fisheries legally permitted to work in the Beach Energy AOIs

To account for any possible short-term temporal variation in fishing effort, fisheries which recorded effort in the previous 20 years in or near the Beach AOIs were deemed as *active*. Table 3 lists all fisheries *legally permitted* (both active and inactive) to fish in Beach AOIs. Fisheries are separated by management body, as well as if there has been effort recorded in the overlapping area in recent years.

Table 3. List of fisheries legally permitted to fish in the Beach AOIs separated by management body, active fisheries indicated by tick mark, inactive indicated by "x".

		Active in area in recent past		
		North Otway	**South Otway**	**Bass Coast**
Commonwealth-managed fisheries	**Commonwealth Trawl Fishery (CTS)**	✓	✓	✓
	Gillnet Hook and Trap (GHaT)	✓	✓	✓
	Southern Squid Jig Fishery (SSJF)	✓	✓	✓
	Bass Strait Central Zone Scallop Fishery (BSCSF)	x	x	✓
	Eastern Tuna and Billfish Fishery (ETBF)	x	x	x
	Skipjack Tuna Fishery	x	x	x
	Southern Bluefin Tuna Fishery	x	x	x
	Small Pelagic Fishery	x	x	x
VIC-managed fisheries	**Victoria Rock Lobster Fishery**	✓	✓	x
	Abalone (Central Zone)	✓	x	x
	Giant Crab (Victoria)	✓	✓	x
	Ocean (General)	✓	x	x
	Purse Seine (Ocean) Fishery	x	x	x
	General (Special) Fishery	x	x	x
	Wrasse (Ocean) Fishery	x	x	x
	Scallop (Ocean) Fishery	x	x	x
TAS-managed	**Rock Lobster Fishery**	x	✓	✓
	Giant Crab Fishery	X	✓	✓
	Scalefish Fishery	x	x	✓

1.2 Commercial Fisheries in the North Otway AOI

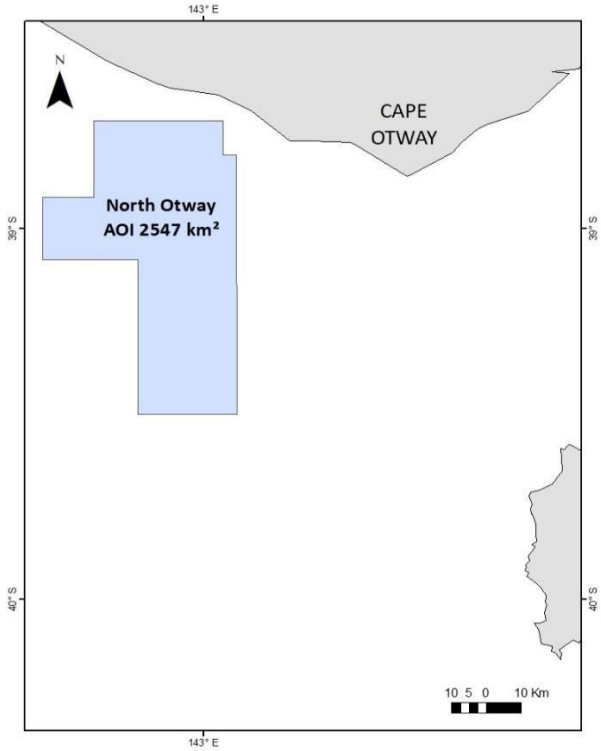


Figure 3. North Otway AOI, position and size.

The North Otway AOI is an irregular shaped zone of 2,547 square kilometres positioned to the west and south of Cape Otway (Figure 3). This report presents data from fishing activity over the past 20 years within the North Otway AOI under Commonwealth (ie. administered by the Australian Fisheries Management Authority) and State (Victorian and Tasmanian) jurisdictions.

See Table 2 for data summary, further detail is provided below.

1.2.1 Commonwealth Fisheries

Commonwealth fisheries active in the AOI within the period from 1/7/2002 to 30/6/2023 were the Southern Squid Jig Fishery (SSJF), the Gillnet Trap and Hook Fishery (GHaT), and the Commonwealth Trawl Fishery (CTS). While this fishing activity yielded approximately $353,000 in average annual revenue, catches within the AOI accounted for less than 1% of total catches in the GHaT and CTS Commonwealth fisheries and 3.1% in the SSJF fishery (Table 2).

Effort varied between sectors with the most effort being from the GHaT with 1,204 shots across the data period (Table 4). This was reflective of the highest number of vessels (35) and the highest catch weight over the period, of 331 t. Whilst the SSJF caught the next highest amount, both in tonnes (199 t) and value ($2.6 million) the CTS had a higher effort with 116 shots across the data period, compared to 99 shots by the SSJF.

Table 4. Summary of number of shots and catch reported from 1/7/2002 to 30/6/2023 from the North Otway AOI by Commonwealth fisheries.

	GHaT	CTS	SSJF
Gear Type	Demersal gillnet Demersal longline Auto longline, Dropline	Bottom otter trawl Danish seine	Squid jigs
Number of shots	1,204	116	99
Catch weight (t)	331	79	199
Catch value $million	2.8	0.4	2.6
Number of vessels	35	14	21

1.2.1.1 Gillnet Trap and Hook Sector (GHaT)

Demersal gillnet, auto longline, dropline, and demersal longline gears have been deployed in the AOI every year of the past twenty. For these methods combined, 35 vessels exerted 1,204 fishing events, which yielded a total catch of 331.4 tonnes for an approximate value of $2.8m (Table 3).

Catches were diverse with gummy shark comprising 34%, school shark 24%, common sawshark 14%, and other species combined 28% (Figure 4). Mean annual catches were consistent in spring, summer, and autumn, but were much lower in winter (Figure 5). Seasonal catch data is not presented for summer as catches were reported by fewer than 5 fishers.

While fishing effort, catches, and subsequent revenue has varied over the past 20 years, it has been yielded by a consistently small fleet of fewer than 8 vessels in every year (Figure 6). Note, GHaT fishing activity in the 2008, 2009, 2013, 2015, and 2016 financial years is not presented in Figure 6 because catches in these years were reported by fewer than 5 vessels. Fishing over the past 20 years in the AOI accounted for 0.9% of total catches in the GHaT fishery (Table 2).

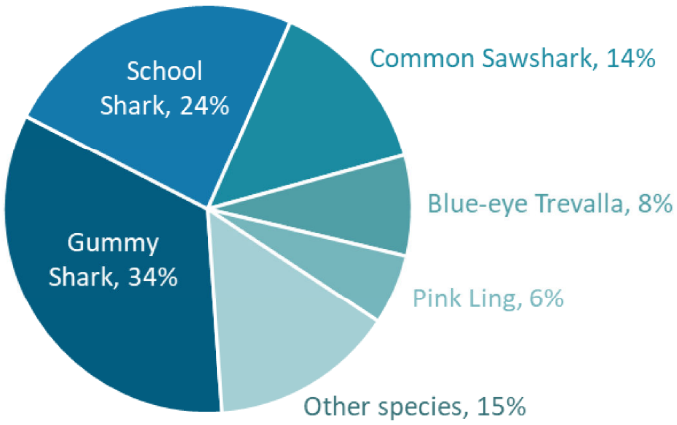


Figure 4. Pie chart showing the top species caught from the North Otway AOI by the GHaT. Note the minimum number of vessels that caught any of the species shown was 7.

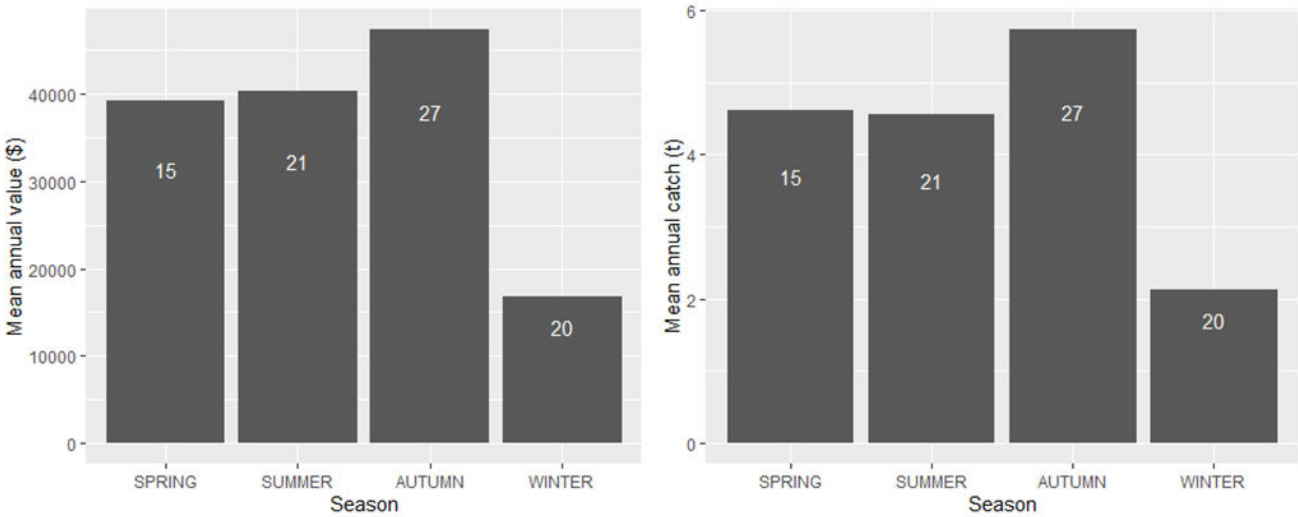


Figure 5. Mean annual catch (left), value (right) per season for the GHaT within the North Otway AOI. Bar labels are the total number of vessels operational by season (years pooled).

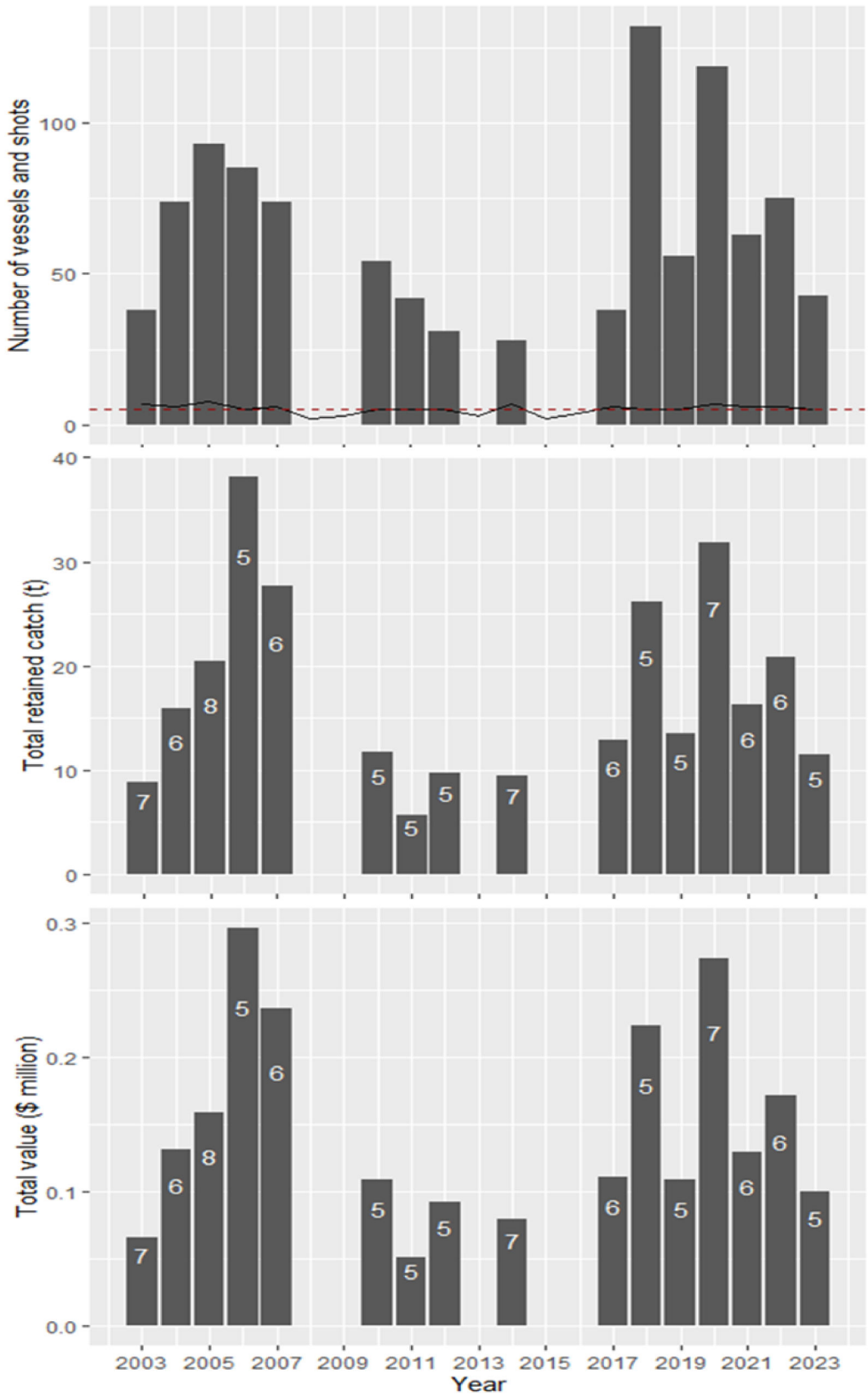


Figure 6. Effort, retained catch and annual value of vessels in the North Otway AOI by the GHaT. A) Number of vessels with effort (black line) and number of shots (bars), the red line intercepts the y-axis at 5. B) Annual retained catch within the fishing data assessment area represented by bars. C) Estimated annual values ($ million) landed within the fishing data assessment area in each year. Number of vessels annotated on bars in B and C.

1.2.1.2 Commonwealth Trawl Sector (CTS)

Bottom otter trawl gear and Danish seine gear have been deployed in the North Otway AOI in the past twenty years by 14 vessels that exerted 116 fishing events yielding a total catch of 79 tonnes for an approximate value of $374,000 (Table 4). Orange roughy accounted for 42% of catches, king dory 11%, and other species 47% (Figure 7).

Mean annual catches were consistent in spring and summer at around half the level of winter catches (Figure 8). Seasonal catch data is not presented for autumn as catches were reported by fewer than 5 fishers.

Annual CTS fishing activity cannot be presented due to confidentiality rules. Five or more vessels were only reported in the data for 2004. Fishing in 2004 was accomplished by 5 vessels that exerted 18 fishing events yielding catches of 12.8 tonnes for an approximate value of $50,000.

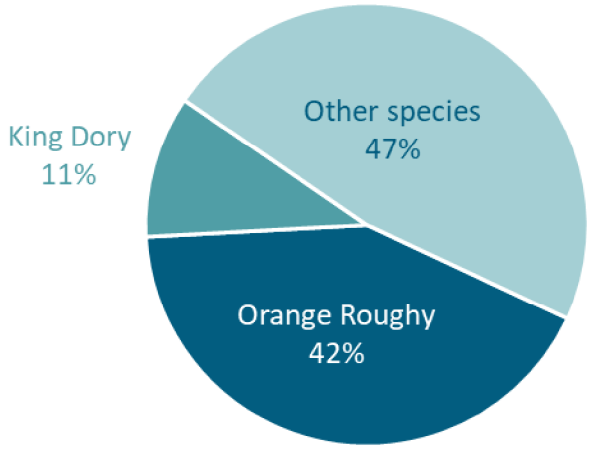


Figure 7. Pie chart showing the top species caught from the North Otway AOI by the CTS. Note the minimum number of vessels that caught any of the species shown was 6.

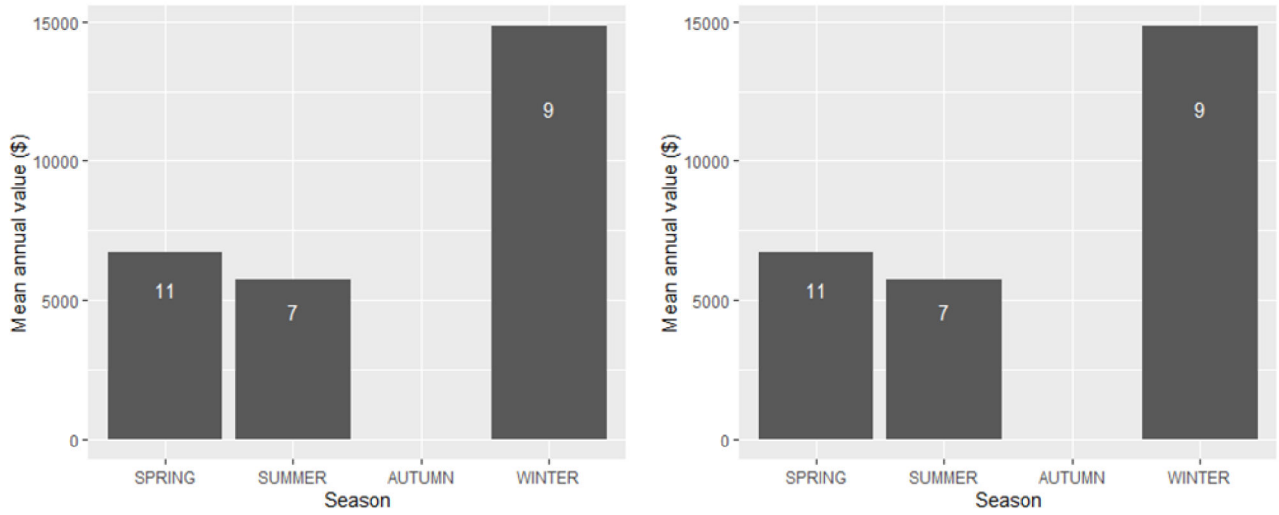


Figure 8. Mean annual catch (left), value (right) per season for the CTS within the North Otway AOI. Bar labels are the total number of vessels operational by season (years pooled).

1.2.1.3 Southern Squid Jig Fishery

Catch form the SSJF consisted entirely of Gould's squid, caught via squid jig. Mean annual catches were much higher in winter than autumn, and no catches were reported in the spring season (Figure 9). Seasonal catch data is not presented for summer as catches were reported by fewer than 5 fishers. Fishing over the past 20 years in the AOI accounted for 3.1% of total catches in the SSJF (Table 2).

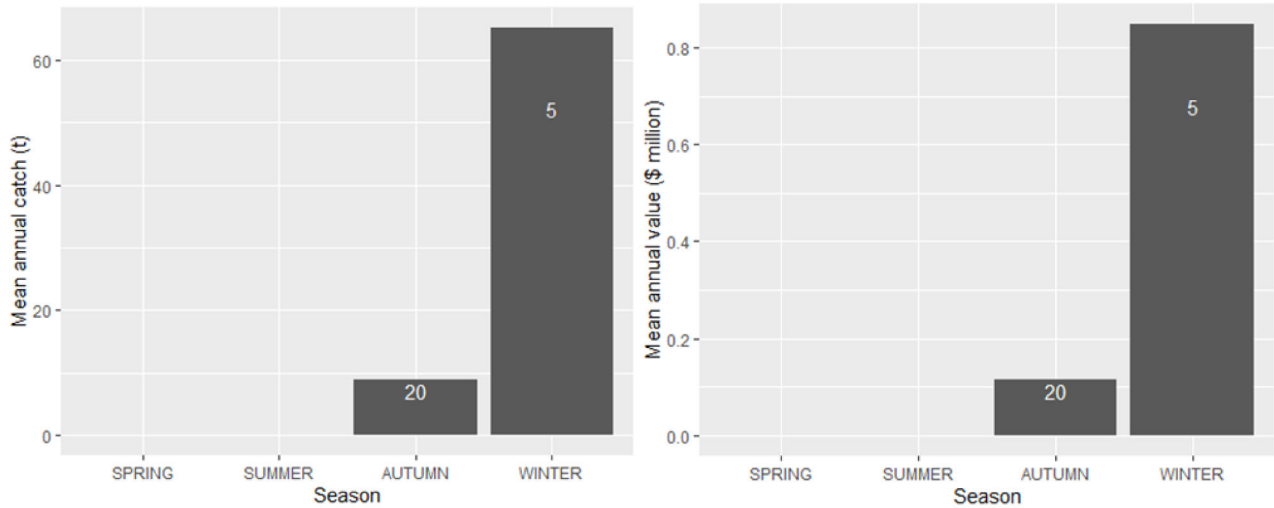


Figure 9. Mean annual catch (left), value (right) per season for the SSJF within the North Otway AOI. Bar labels are the total number of vessels operational by season (years pooled).

1.2.2 State Fisheries Victoria

1.2.2.1 Southern Rock Lobster Fishery

Rock lobster trapping gear has been deployed in the AOI in the past twenty years by 47 fishers with a total effort of 3,516 days fished (Table 5 A total catch of 216 tonnes yielded revenue of approximately $382,654 (Table 5). The average annual catch over the past 20 years of rock lobster within the North Otway AOI accounts for 4.2% of total catches of rock lobster in the 2020/21 fishing season (Table 5).

1.2.2.2 Abalone (blacklip) Fishery

Blacklip abalone were taken in the AOI in the past twenty years by 40 fishers with a total effort of 303 days fished (Table 5). A total catch of 144.1 tonnes yielded revenue of approximately $259,693 (Table 5). The average annual catch over the past 20 years of blacklip abalone within the North Otway AOI accounts for 3% of total catches of blacklip abalone in the 2020/21 fishing season (Table 5)

1.2.2.3 Giant Crab Fishery (Western Zone)

Giant crab trapping gear has been deployed in the AOI in the past twenty years by 18 fishers with a total effort of 1,361 days fished (Table 5). A total catch of 145 tonnes yielded revenue of approximately $135,678 (Table 5). Fishery data are not presented for all other species captured in this fishery because catches were reported by fewer than 5 vessels (Table 5). The average annual catch over the past 20 years of giant crab within the North Otway AOI accounts for 81% of total catches of giant crab in the 2020/21 fishing season (western management zone) (Table 5).

Table 5. Summary of catch by species, percent of total catch, number of vessels, number of days fished and number of fishers from 1/1/2003 to 31/12/2022 in Victorian reporting grids that overlapped with the AOI (excluding Pipis).

Species	Catch (t)	Number of Vessels	Percent of total fishery catch	Number of Days Fished	Number of Fishers
Rock lobster, Southern	216	63	4.3%	3,516	47
Crab, giant	145	23	81%	1,361	18
Abalone, Blacklip	144	40	11.3%	303	40
Octopus	2.3	40	*Confidential*	539	29
Crab, Hermit	NA	2	*Confidential*	11	2
Leatherjacket	0.8	6	*Confidential*	167	6
Snapper	0.7	8	*Confidential*	32	8
Wrasse, Unspecified	0.2	5	*Confidential*	63	5
Trumpeter, Striped	*Confidential*	4	*Confidential*	8	4
Shark, school	*Confidential*	3	*Confidential*	7	3
Shark, Blue Whaler	*Confidential*	1	*Confidential*	2	1
Shark, gummy	*Confidential*	3	*Confidential*	7	3
Shark, Rusty	*Confidential*	1	*Confidential*	7	1
Shark, Other (unspecified)	*Confidential*	1	*Confidential*	6	1
Barracouta	*Confidential*	1	*Confidential*	2	1
Eel, Conger	*Confidential*	1	*Confidential*	1	1
Shells	*Confidential*	1	*Confidential*	10	1
Whiting, King George	*Confidential*	1	*Confidential*	1	1
Australian salmon	*Confidential*	1	*Confidential*	1	1
Octopus, Maori	*Confidential*	1	*Confidential*	1	1
Trevally, silver	*Confidential*	1	*Confidential*	1	1
Warehou, blue	*Confidential*	1	*Confidential*	1	1
Ling, Banded	*Confidential*	1	*Confidential*	1	1

1.2.3 State Fisheries Tasmania

There are four Giant Crab and Rock Lobster fishery reporting grids which overlap with the North Otway AOI, however, there has been no effort reported within these grids from 2003-2022.

1.3 Commercial Fisheries in the South Otway AOI

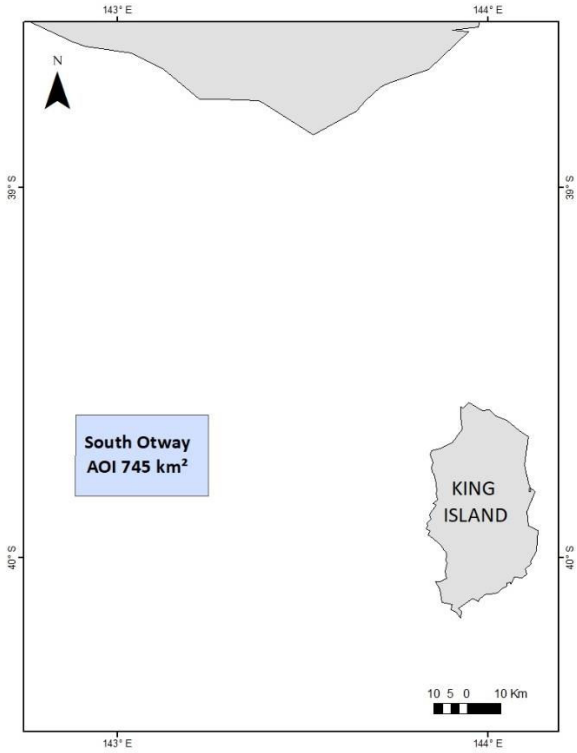


Figure 10. South Otway AOI position and size

The South Otway AOI is a rectangular zone of 745 square kilometres positioned to the west of King Island (Figure 10). This report presents data from fishing activity over the past 20 years within the South Otway AOI under both Commonwealth (ie. administered by the Australian Fisheries Management Authority) and State jurisdictions (Victoria and Tasmania).

See Table 2 for data summary, further detail is outlined below.

1.3.1 Commonwealth Fisheries

Commonwealth fisheries active in the AOI within the period from 1/7/2002 to 30/6/2023 were the Gillnet Trap and Hook Fishery (GHaT), the Commonwealth Trawl Fishery (CTS), and the Southern Squid Jig Fishery (SSJF). While this fishing activity yielded approximately $111,550 in revenue, catches within the AOI accounted for less than 0.5% of total catches in each Commonwealth fishery (Table 2).

Table 6. Summary of number of shots and catch reported from 1/7/2002 to 30/6/2023 from the South Otway AOI by Commonwealth fisheries.

	GHaT	CTS	SSJF
Gear Type	Demersal gillnet Demersal longline Auto longline, Dropline	Bottom otter trawl	Squid jigs
Number of shots	199	135	*Confidential*
Catch weight (t)	159	164	*Confidential*
Catch value $million	1.3	0.7	*Confidential*
Number of vessels	12	9	<5

1.3.1.1 Gillnet Trap and Hook Sector (GHaT)

Demersal gillnet, auto longline, dropline and demersal longline gears have been deployed in the South Otway AOI in the past twenty years. For these methods combined, 12 vessels exerted 199 fishing events, which yielded a total catch of 159.2 tonnes for an approximate value of $1.3m (Table 2). Blue-eye trevalla dominated catches (58%), with smaller catches of pink ling (16%), and other species combined (26%) ().

Mean annual catches were highest in summer and lowest in winter (Figure 3, Figure 4).

Annual GHAT effort and catches are not presented because catches were reported by fewer than 5 vessels. Fishing over the past 20 years in the AOI accounted for 0.5% of total catches in the GHAT fishery (Table 2).

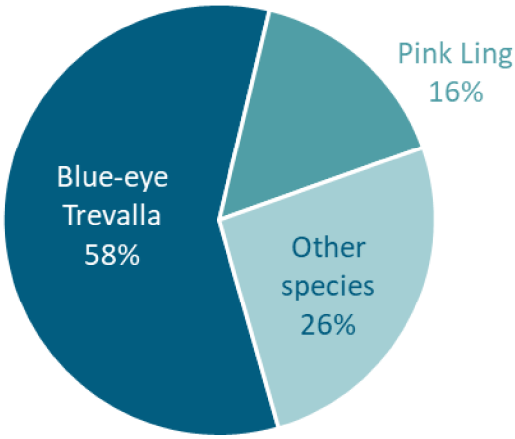


Figure 11. Pie chart showing the top species caught from the South Otway AOI by the GHaT. Note the minimum number of vessels that caught any of the species shown was 6.

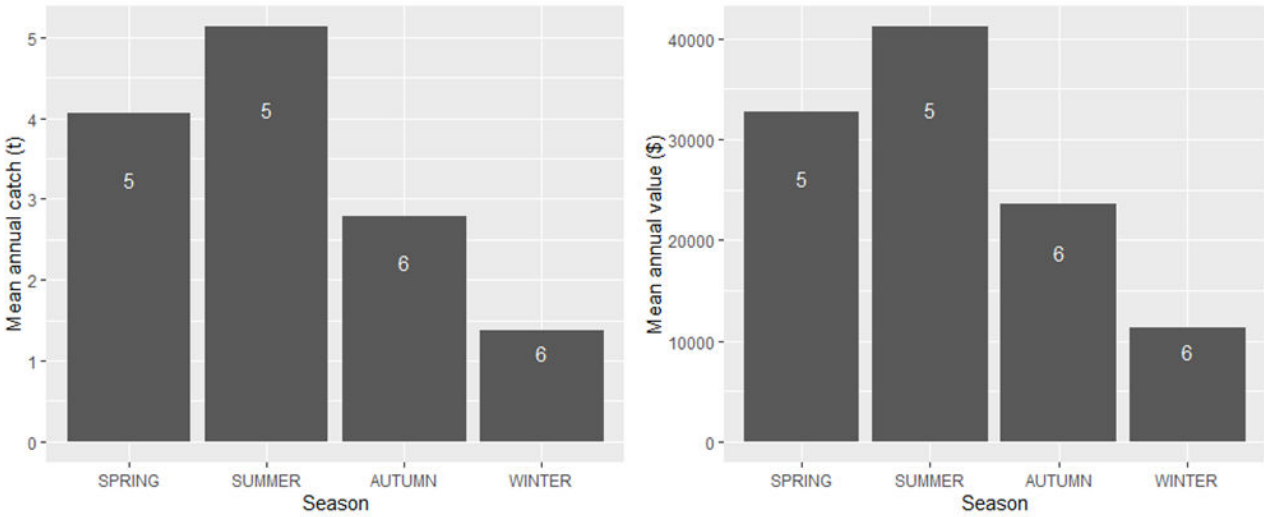


Figure 12. Mean annual catch (left), value (right) per season for the GHaT within the South Otway AOI. Bar labels are the total number of vessels operational by season (years pooled).

1.3.1.2 Commonwealth Trawl Sector (CTS)

Bottom otter trawl gear has been deployed in the AOI in the past twenty years by 9 vessels that exerted 135 fishing events yielding a total catch of 164.4 tonnes for an approximate value of $647,000 (Table 3). Orange roughy accounted for 31.9% of catches (Figure 5). Further catch composition detail is confidential due to fewer than 5 vessels reporting for every other species caught.

Mean annual catches were consistent by season (Figure 6, Figure 7). Seasonal catch data is not presented for Autumn as catches were reported by fewer than 5 fishers.

Yearly CTS fishing activity is only reported for 2004 because in every other year catches were reported by fewer than 5 vessels. Fishing in 2004 was accomplished by 5 vessels that exerted 36 fishing events that yielded catches of 34.4 tonnes for an approximate value of $136,000. Fishing over the past 20 years in the AOI accounted for 0.04% of total catches in the CTS fishery (Table 2).

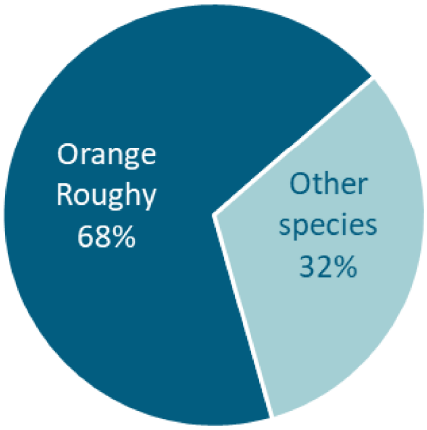


Figure 13. Pie chart showing the top species caught from the South Otway AOI by the CTS. Note the minimum number of vessels that caught any of the species shown was 6.

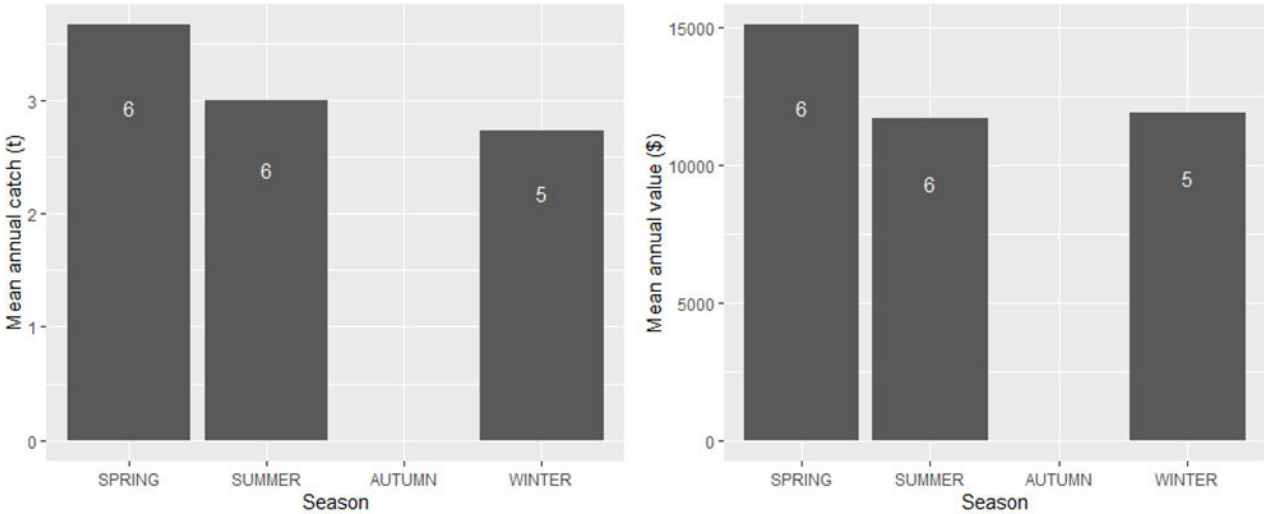


Figure 14. Mean annual catch (left), value (right) per season for the CTS within the South Otway AOI. Bar labels are the total number of vessels operational by season (years pooled).

1.3.1.3 Southern Squid Jig Fishery

Squid jig gears have been deployed in the AOI in the past twenty years. Summary, annual and seasonal squid jig effort and catch data are not presented because catches were reported by fewer than 5 vessels (Table 6). Squid fishing over the past 20 years in the AOI accounted for 0.2% of total catches in the SQJ fishery (Table 2).

1.3.2 State Fisheries Victoria

1.3.2.1 Giant Crab Fishery (Western Zone)

Giant crab trapping gear has been deployed in the South Otway AOI in the past twenty years by 12 fishers with a total effort of 646 days fished (Table 7). A total catch of 111 tonnes yielded revenue of approximately $103,329 (Table 2).

The average annual catch over the past 20 years of giant crab within the South Otway AOI accounts for 61% of total catches of giant crab in the 2020/21 fishing season (western management zone) (Table 7).

1.3.2.2 Southern Rock Lobster Fishery

Rock lobster trapping gear has been deployed in the South Otway AOI in the past twenty years by 16 fishers with a total effort of 304 days fished (Table 7). A total catch of 9.5 tonnes yielded revenue of approximately $16,760 ().

The average annual catch over the past 20 years of rock lobster within the South Otway AOI accounts for 0.2% of total catches of rock lobster in the 020/21 fishing season (Table 7).

Table 7. Summary of catch by species, percent of total catch, number of vessels, number of days fished and number of fishers from 1/7/2003 to 30/6/2023 in Victorian reporting grids that overlapped with the AOI (excluding Pipis).

Species	Catch (t)	Number of Vessels	Percent of total catch	Number of Days Fished	Number of Fishers
Crab, giant	111	17	61%	646	12
Rock lobster, Southern	9.5	19	0.2%	304	16
Octopus	0.12	8	NA	39	6
Trumpeter, Striped	*Confidential*	2	*Confidential*	6	2
Leatherjacket	*Confidential*	2	*Confidential*	7	2
Shark, school	*Confidential*	1	*Confidential*	4	1
Shark, gummy	*Confidential*	1	*Confidential*	2	1
Crab, Hermit	*Confidential*	1	*Confidential*	1	1
Ling, Banded	*Confidential*	2	*Confidential*	3	2
Ling, Rock	*Confidential*	1	*Confidential*	1	1
Shells	*Confidential*	1	*Confidential*	1	1
Snapper	*Confidential*	1	*Confidential*	1	1

1.3.3 State Fisheries Tasmania

1.3.3.1 Tasmanian Rock Lobster & Giant Crab Fisheries

There are four Tasmanian Giant Crab and Rock Lobster fishery reporting grids which overlap with the South Otway AOI (Figure 2). Data from the giant crab fishery comes from less than five vessels so cannot be reported. The Rock Lobster fishery reported catch from eight vessels in these four grids from 2003 – 2022, these vessels had 10 days of effort catching 0.25 t at a value of approximately $20,000.

1.4 Commercial Fisheries in the Bass Coast AOI

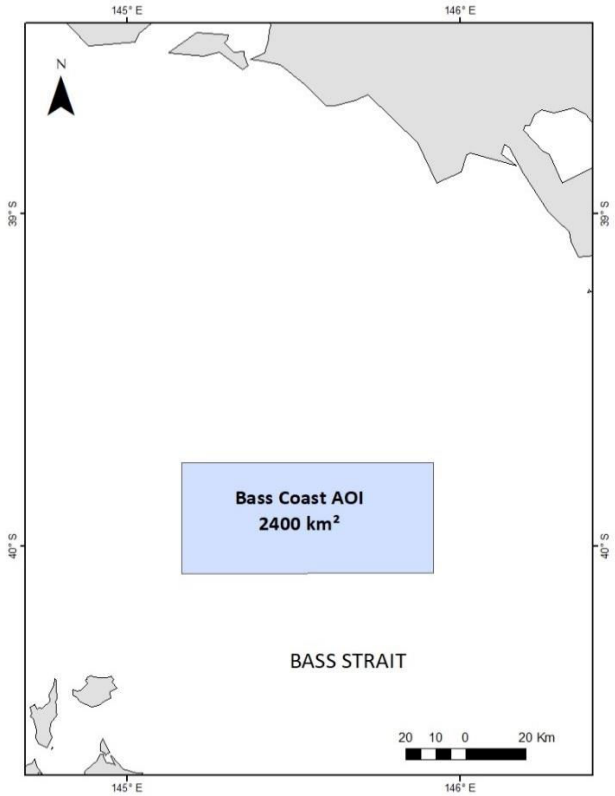


Figure 15. Bass Coast AOI, position and size.

The Bass Coast AOI is a rectangular zone of 2,400 square kilometres positioned between Port Phillip Bay and the north-western extremity of Tasmania in western Bass Strait (Figure 15). This report presents data from fishing activity over the past 20 years within the Bass Coast AOI under Commonwealth jurisdiction (ie. administered by the Australian Fisheries Management Authority) and Tasmanian State jurisdiction. Fishing activity under Victorian State jurisdiction was not conducted within the AOI over this period as the reporting grids do not overlap.

See Table 2 for data summary, further detail is provided below.

1.4.1 Commonwealth Fisheries

Commonwealth fisheries active in the AOI within the period from 1/7/2002 to 30/6/2023 were the Gillnet Trap and Hook Fishery (GHAT), the Bass Strait Scallop Fishery (SCA), the Southern Squid Jig Fishery (SQJ) and the Commonwealth Trawl Fishery (CTS). While this fishing activity yielded approximately $132,312 in revenue, catches within the AOI accounted for less than 1% of total catches in each fishery (Table 2).

Table 8. Summary of number of shots and catch reported from 1/7/2002 to 30/6/2023 from the Bass Coast AOI by Commonwealth fisheries

	CTS	GHaT	SSJF	BSCZSF
Gear Type	Bottom otter trawl Danish seine	Demersal gillnet Demersal longline Auto longline Dropline	Squid jigs	Scallop dredge
Number of shots	*Confidential*	713	*Confidential*	12
Catch weight (t)	*Confidential*	188	*Confidential*	88
Catch value $million	*Confidential*	1.8	*Confidential*	0.2
Number of vessels	<5	39	<5	5

1.4.1.1 Gillnet Trap and Hook Sector (GHaT)

Demersal gillnet and demersal longline gears have been deployed in the Bass Coast AOI every year of the past twenty. For these methods combined, 39 vessels exerted 713 fishing events, which yielded a total

catch of 188 tonnes for an approximate value of $1.8 (Table 8). Gummy shark dominated catches (73%), with smaller catches of school shark (17%), and other species combined (17.1%) (Figure 16).

Mean annual catches were variable by season with highest catches in winter and lowest in summer (Figure 17).

Fishing effort has been consistent over the last decade (around 50 to 75 fishing events) exerted by a fleet of 5 to 13 vessels (Figure 18) with annual catches and revenue also consistent with the exception of particularly high yields in 2020 and 2021 (Figure 18). GHaT fishing activity in the 2005, 2006, 2008, 2009, and 2011 financial years are not presented in Figures 3 to 5 because catches in these years were reported by fewer than 5 vessels. Fishing over the past 20 years in the AOI accounted for 0.5% of total catches in the GHaT fishery (Table 2).

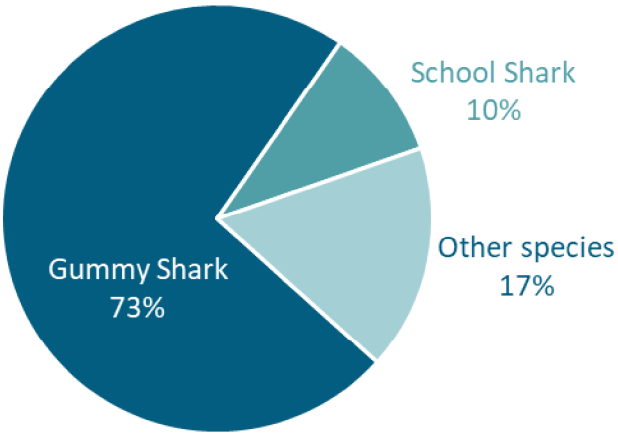


Figure 16. Pie chart showing the top species caught from the Bass Coast AOI by the GHaT. Note the minimum number of vessels that caught any of the species shown was 31.

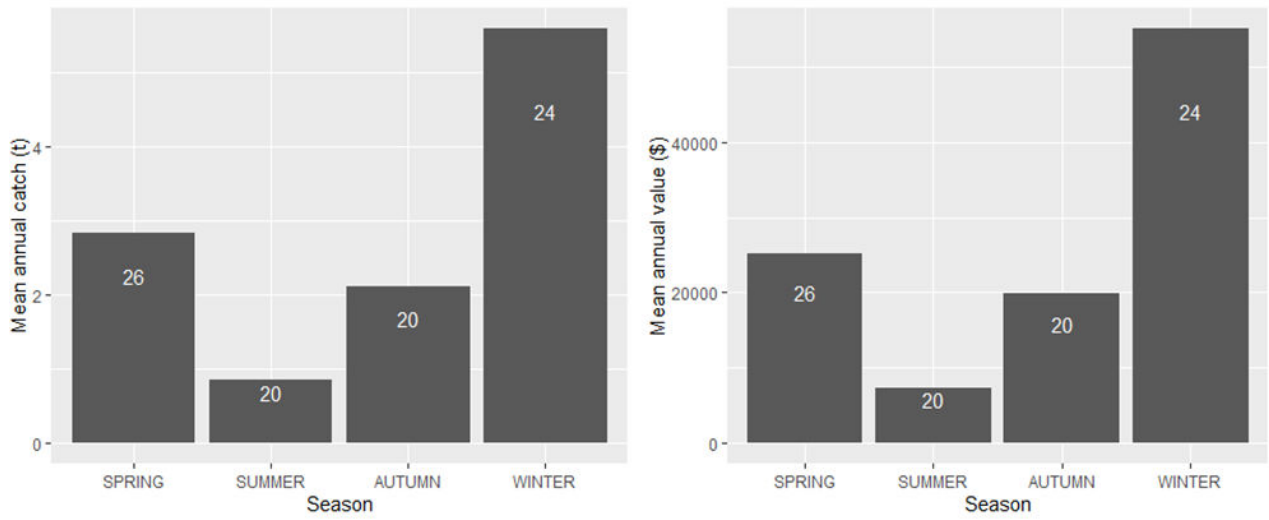


Figure 17. Mean annual catch (left), value (right) per season for the GHaT within the Bass Coast AOI. Bar labels are the total number of vessels operational by season (years pooled).

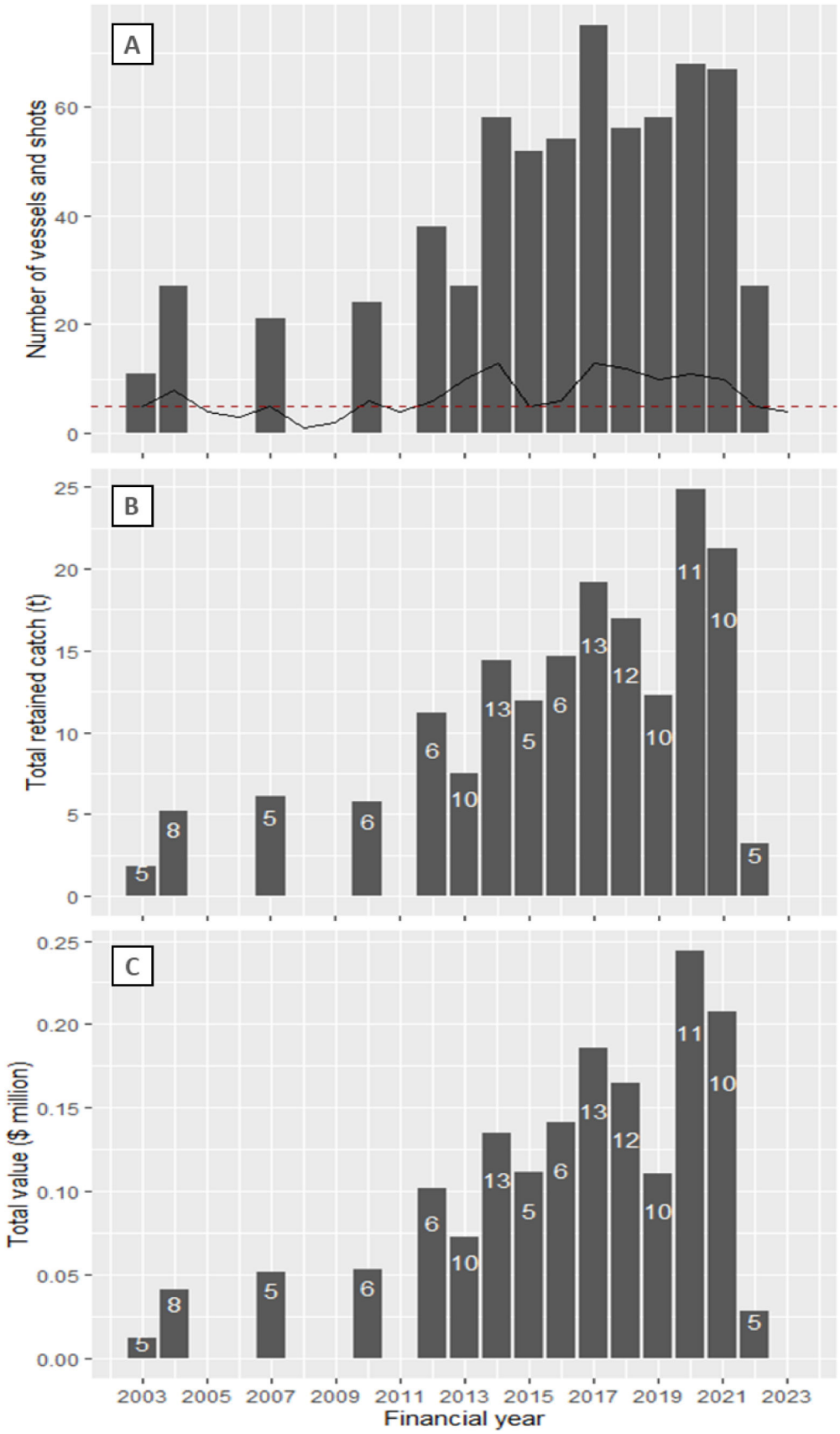


Figure 18. Effort, retained catch and annual value of vessels in the Bass Coast AOI by the GHaT. A) Number of vessels with effort (black line) and number of shots (bars), the red line intercepts the y-axis at 5. B) Annual retained catch within the fishing data assessment area represented by bars. C) Estimated annual values ($ million) landed within the fishing data assessment area in each year. Number of vessels annotated on bars in B and C.

1.4.1.2 Commonwealth Trawl Sector (CTS)

Bottom otter trawl and Danish seine gears have been deployed in the AOI in four of the past twenty years. For these methods combined, summary and annual effort and catches are not presented because catches were reported by fewer than 5 vessels. No fishing was reported in spring and seasonal catch data cannot be presented for summer, autumn and winter as catches were reported by fewer than 5 vessels.

Catches from bottom otter trawl and Danish seine gears combined over the past 20 years in the AOI accounted for less than 0.01% of total catches in the CTS fishery (Table 2).

1.4.1.3 Southern Squid Jig Fishery (SSJF)

Whilst the SSJF was active in the Bass Coast AOI during the data period (four of the past 20 years reported data), data is confidential as it comes from less than 5 vessels.

1.4.1.4 Bass Strait Central Zone Scallop Fishery (BSCZSF)

Scallop dredge gears have been deployed in the AOI in five of the past twenty years. Five vessels exerted 12 fishing events which yielded a total catch of 88.2 tonnes of scallops for an approximate value of $214,000 (Table 2). Retained catches comprised of 100% commercial scallops. Annual dredge effort and catches are not presented because catches were reported by fewer than 5 vessels.

The mean annual catch for winter was 10 tonnes and no scallops were caught in summer or autumn (Figure 19). Seasonal catch data is not provided for spring as catches were reported by fewer than 5 fishers.

Scallop fishing over the past 20 years in the AOI accounted for 0.6% of total catches in the SCA fishery (Table 2).

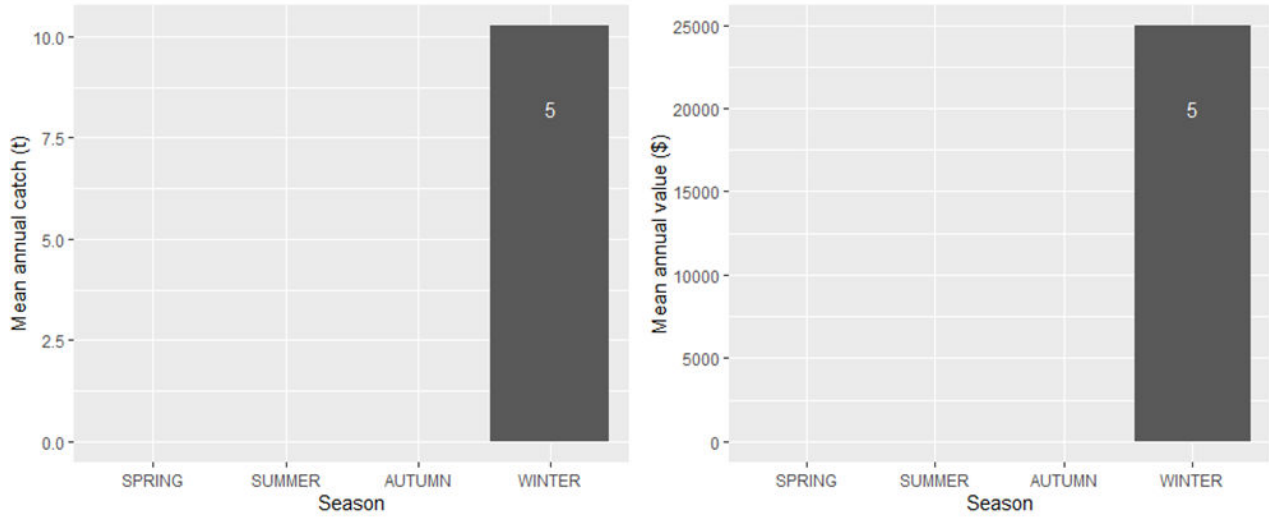


Figure 19. Mean annual catch (left), value (right) per season for the BSCZSF within the Bass Coast AOI. Bar labels are the total number of vessels operational by season (years pooled).

1.4.2 State Fisheries Tasmania

1.4.2.1 Tasmanian Giant Crab and Rock Lobster Fishery

There are four Tasmanian Giant Crab and Rock Lobster fishery reporting grids which overlap with the South Otway AOI (Figure 2). Less than 5 fishers reported effort in the Tasmanian Giant Crab Fishery, and so data can not be reported. Five different fishers reported 18 days of Rock Lobster Fishery effort in the Bass Strait AOI, catching 0.539 t of Southern Rock Lobster valued at $0.038m.

1.4.2.2 Tasmanian Scalefish Fishery

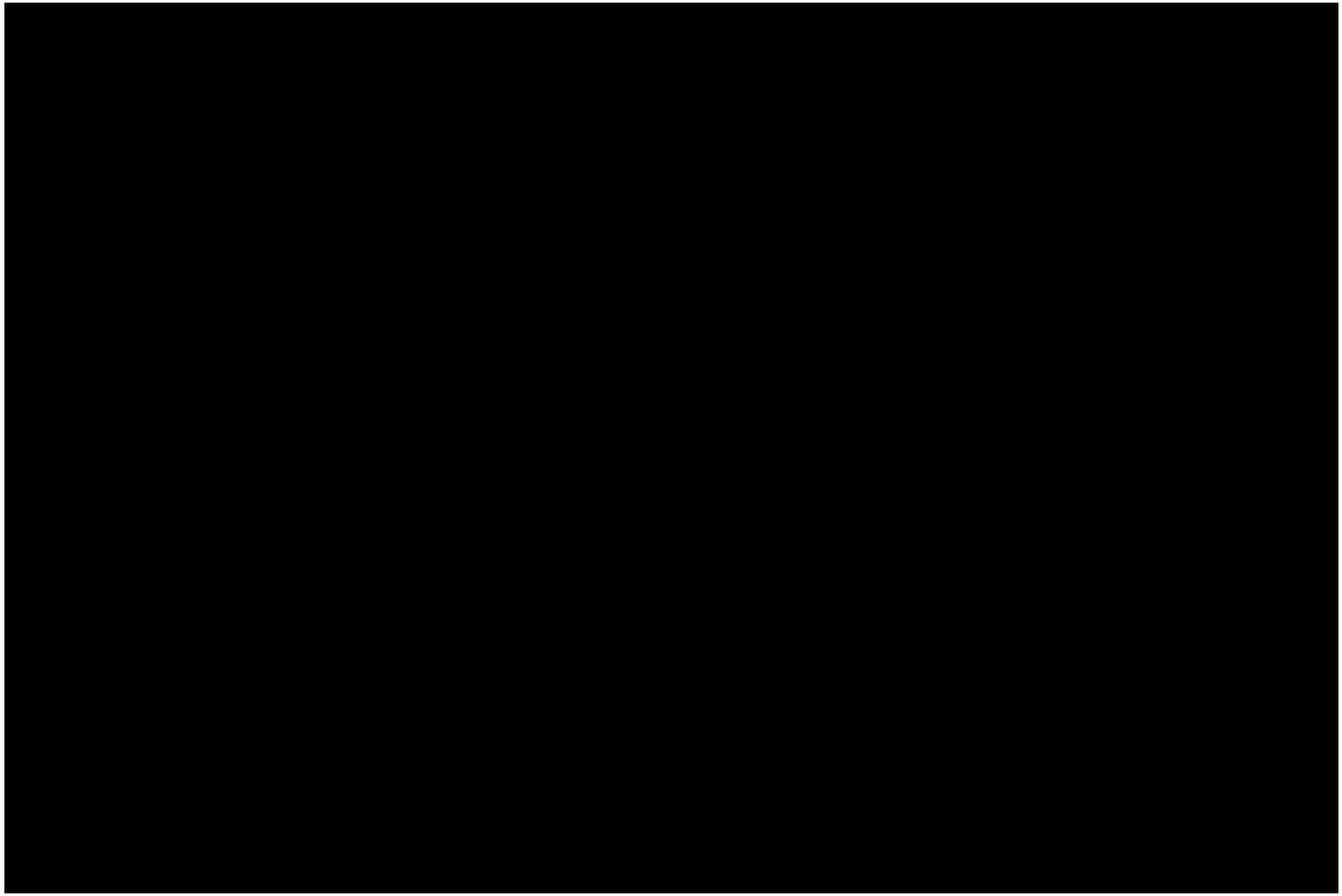
There were 14 different fishing vessels within the Tasmanian Scalefish Fishery that recorded effort from within the Bass Strait AOI during 2003–2022. They reported 365 days of fishing, catching 149 t of fish valued at $0.8 m. A wide variety of fishing gears were used, with octopus pots/traps catching the most of all gears. Whilst there were several different species caught within the fishery most were caught by less than 5 vessels and so more details cannot be reported. However, there was a total of 896 kg of Southern Calamari reported by 7 fishers.

Table 9. Summary of number of shots and catch reported from Tasmanian state fisheries overlapping with the Bass Coast AOI

	Rock Lobster Fishery	Scalefish Fishery
Gear Type	Rock Lobster Pot	Shark Net, Octopus Pot/Trap, Troll, Hand Line, Small Mesh Net, Beach Seine, Hand Squid Jig, Automatic Squid Jig, Shark Longline
Number of days	18	365
Catch weight (t)	0.54 t	149 t
Catch value $million	$0.04 m	$0.8 m
Number of vessels	5	14

2. CTS TRAWL TRACKS AND THE OTWAYS REGION

All trawl data from the past twenty years has been combined to show trawl effort in the Otway Basin in relation to the Beach AOIs. It is evident from the maps in Figure x and x that most fishing effort, particularly trawl is between the 400 and 1,000m isobath. This does not significantly impact the North Otway AOI, cutting across the south-western corner, however, the South Otway AOI is directly over this relatively high traffic area. It is a recommendation of this report for Beach Energy to avoid depths between the 400-100m isobaths to minimise the impact on fishing, particularly the CTS.



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3. COMMERCIAL FISHING – GENERAL INFORMATION

There are eleven different Commonwealth, Victorian and Tasmanian fisheries with recent fishing activity in the study area. Table 10 outlines the fisheries, management authority and fishing methods used in each fishery.

Table 10. Operation of Commonwealth and State managed fisheries who have actively fished within the study area in the past 20 years.

				Fishery	Fishing methods
Commonwealth- managed	SESSF			Commercial Trawl Sector	Otter-board trawl (mid-water and demersal)
					Danish seine
		GHAT		Shark Gillnet and Shark Hook Sector	Demersal gillnet
					Demersal longline
				Scalefish hook sectors	Demersal longline
				Southern Squid Jig Fishery	Squid jig
				Bass Straight Central Zone Scallop fishery	Scallop dredge
State- managed	Victoria			Abalone and Sea Urchin	Diving
				Ocean General Fishery	Demersal longline; Demersal Gillnet; Squid Jig; Minor line; Purse seine
				Rock Lobster Fishery	Rock Lobster Pots
				Giant Crab Fishery	Crab Pots
	Tasmania			Giant Crab Fishery	Crab Pots
				Rock Lobster Fishery	Rock Lobster Pots
				Scalefish Fishery	Various methods including; pot; hook and line (handline), Gillnet; Squid Jig; beach seine; Danish seine; Purse seine

SOUTHERN AND EASTERN SCALEFISH AND SHARK FISHERY (SESSF)

The Southern and Eastern Scalefish and Shark Fishery (SESSF) extends from Cape Leeuwin in Western Australia to Fraser Island in Queensland (QLD) and is comprised of five sectors: the Commonwealth Trawl Sector (CTS), Great Australian Bight Trawl Sector (GABTS), East Coast Deepwater Trawl Sector (ECDTS), Gillnet and Shark Hook Sector (SGSHS) and Scalefish Hook Sector (SHS) (Figure 22). The SESSF gross value of production (GVP) was $110 million in the 2020-21 financial year accounting for almost 30% of Commonwealth fisheries GVP.

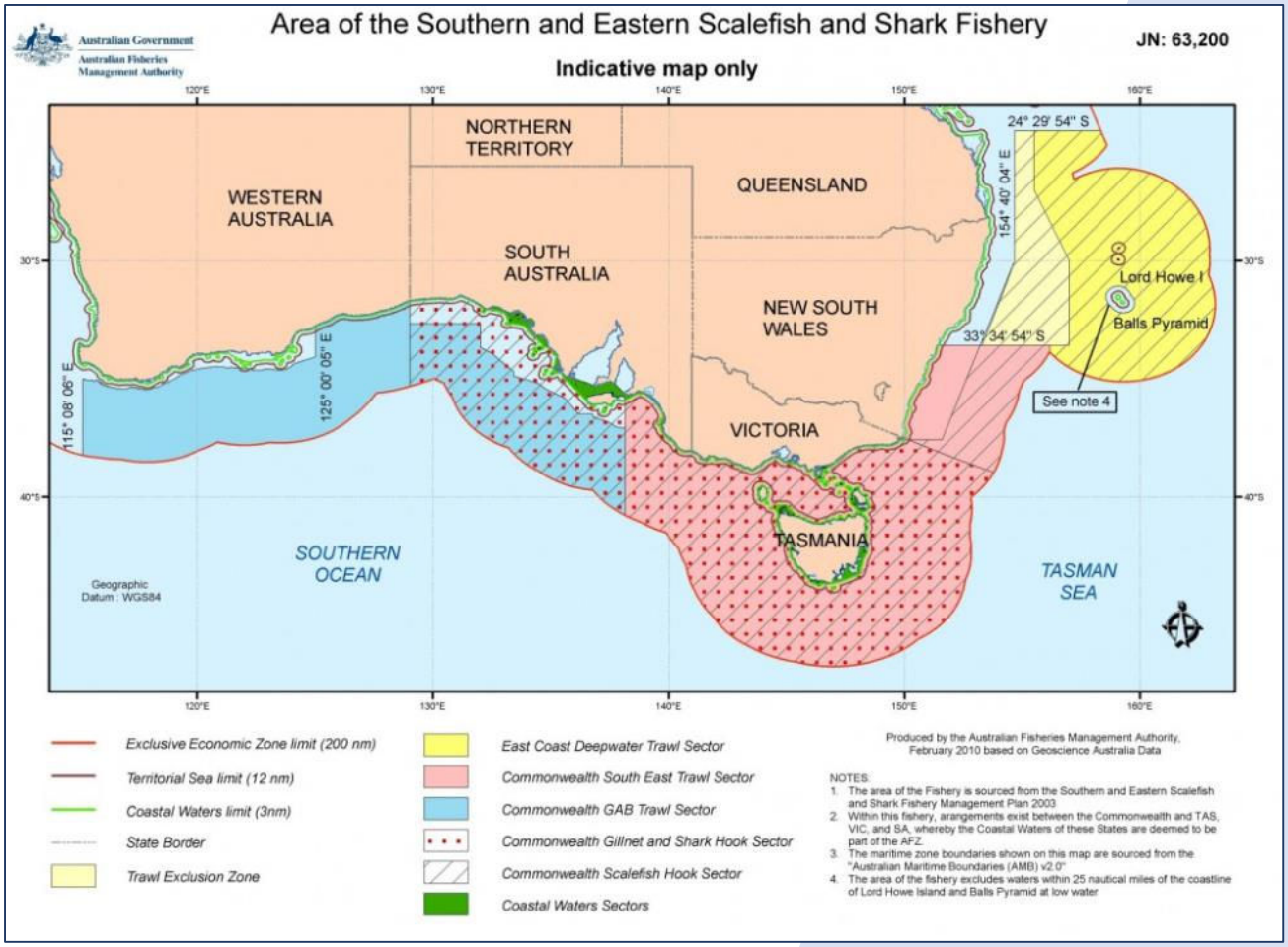


Figure 22. The Commonwealth managed Southern and Eastern Scalefish and Shark Fishery (SESSF) showing the areas of the Commonwealth Trawl Sector (CTS, pink) and Gillnet and Shark Hook sectors (GHAT, dotted),

The Australian Fisheries Management Authority (AFMA) manages fisheries to maintain stocks at ecologically sustainable levels, while maximising the net economic returns to the Australian community. The main management measures used in the SESSF include limited entry, gear restrictions, closed areas and Total Allowable Catch (TAC) limits. A limited number of statutory fishing right (SFR) vessel permits exist and one is required on each vessel operating in the fishery. Additionally, any fish species managed under quota must be landed against quota SFRs. Annual TACs are set based on outcomes of stock assessments conducted for each quota species. Quota SFRs are converted to tonnes of quota (TAC) each year depending on the annual TAC that is set.

More than 100 species are regularly landed in the SESSF but only the main species are managed under quotas. At present, there are 34 fish stocks subject to total allowable catches (TACs, Table 11).

SESSF

Table 11. List of 2022–23 TACs (whole fish unless otherwise stated) for SESSF quota species (AFMA SESSF Management Arrangement Booklet, 2022).

Species	TAC (t)	Species	TAC (t)
Alfonsino	1,017	Orange Roughy – (GAB)	50
Bight Redfish (GAB)	890	Orange Roughy – (Cascade)	397
Blue Eye Trevalla	241	Orange Roughy – (east)	1,072
Blue Grenadier	18,275	Orange Roughy – (south)	113
Blue Warehou	50	Orange Roughy – (west)	60
Deepwater Flathead (GAB)	1,238	Oreo (smooth Cascade)	150
Deepwater Shark (east)	24	Oreo (smooth other)	90
Deepwater Shark (west)	235	Oreo (basket)	137
Elephant Fish	114	Pink Ling	1,568
Flathead (Tiger)	2,333	Redfish	30
Gemfish East	100	Ribaldo	397
Gemfish West	340	Royal Red Prawn	651
Gummy Shark	1,672[14]	Sawshark	519
Jackass Morwong	20	School Shark	250
John Dory	60	School Whiting	917
Mirror Dory	129	Silver Trevally	51
Ocean Perch	305	Silver Warehou	350

[14] Trunk weight

SESSF

COMMONWEALTH TRAWL SECTOR

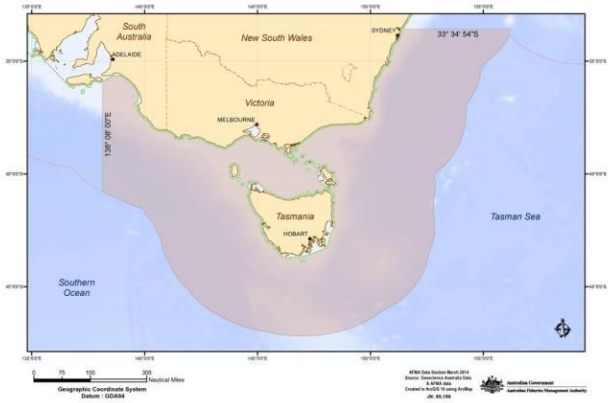


Figure 23. Map of the Commonwealth Trawl Sector (CTS)

The Commonwealth Trawl Sector (CTS) is one of the oldest commercial fisheries in Australia with more than 100 years of catch history. The fishery extends from Barrenjoey Point in NSW to Cape Jervis in SA (Figure 23) and is managed by quota across 34 species/groups.

All Commonwealth licensed vessels must carry Vessel Monitoring Systems (VMS), which provide the exact location of trawl vessel tracks in real time. There were 34 otter board trawl vessels and 20 Danish seine vessels active in the fishery in 2020-21, with effort of over 50,000 trawl hours and 10,758 Danish seine shots.

Target species for the CTS board trawl subsector include Blue Grenadier, Mirror Dory and Pink Ling. Total annual catch (fishery wide) in the CTS peaked in 1990 at just over 60,000 t, but fell to 20,000–30,000 t during the late 1990s (Figure 25), mainly as a result of overfishing Orange Roughy. Catches again fell from about 30,000 t in 2000 to below 10,000 t in 2014, but increased to more than 18,000 t in 2020–21 (Figure 25). This catch equated to $64m in GVP (inclusive of scalefish hook subsector), a 38% increase compared to 2019-20.

Methods used:

- Otter board trawl
- Danish seine

Trawl fishers typically fish to a maximum depth of 1,200m. Otter-board trawl vessels are typically 18-28 m and are powered by 250–700 HP engines (Figure 24). CTS Danish seine vessels are typically 15–20 m long and powered by 250–300 HP engines.

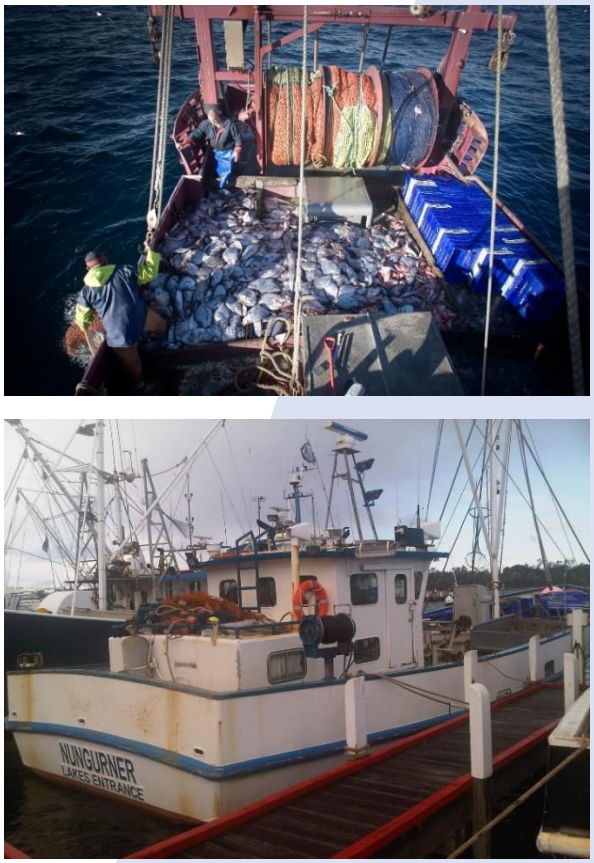


Figure 24. Rear of vessel on typical otter board trawl (above), typical Danish seine vessel (below).

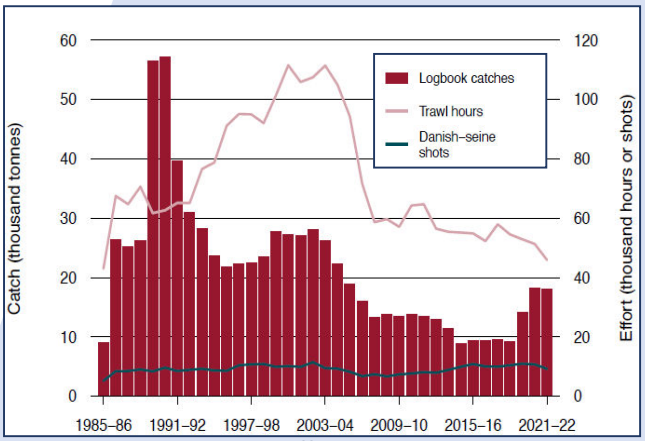


Figure 25. CTS catch and effort data

SESSF

SHARK HOOK AND SHARK GILLNET SECTOR

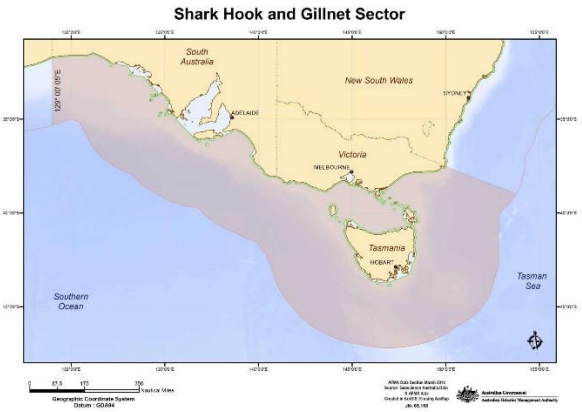


Figure 26. Map of the Shark Hook and Shark Gillnet

The Shark Hook and Shark Gillnet Sector (SHSGS) includes waters of the AFZ between the NSW/VIC border to the SA/WA border (Figure 26). Gillnetting is limited by marine parks, fishery closures, unfishable grounds, unproductive grounds and other fishery closures. Currently, gillnetting is not permitted in Commonwealth waters deeper than 183 m (equivalent to 100 fathoms) to protect certain deeper-water species.

The SHSGS is managed by TACs, however, the maximum gillnets length that can be used in 6,000 m (provided video monitoring is present onboard) but most use between 4,000 m and 6,000 m.

Catch in the SGSHS peaked at more than 4,000 t during 1986, and effort peaked in the following year at more about 120,000 km-lifts (Figure 28). Catch and effort has decreased by more than 50% since, mainly due to declining stocks of School Shark, conservative School Shark management and removal of effort through Government-led structural adjustments and closures. Despite this decrease, Gummy Shark landings have increased from 1,288 t in 2012–2013 to 1,695 t in 2020–2021. Main target species are Elephantfish, gummy shark, school shark and sawshark.

During 2020–2021 there were 31 active shark gillnet and shark hook sector vessels operating gillnets and 38 vessels using demersal longlines hauling 27,820 km of net and setting 2,881,959 hooks (Figure 29). This landed 1,970 t of shark and $22.61 m in GVP.

Shark gillnetters may lay-up at anchor during bad weather or while fishing gear soaks. A prime example of a medium sized aft wheelhouse shark gillnetter vessel (15m in length) is seen in Figure 27.

Methods used:

- Demersal gillnets
- Demersal longline and auto longline

Figure 27. FV Erin Jay - a Commonwealth shark gillnetter fishing out of Lakes Entrance.

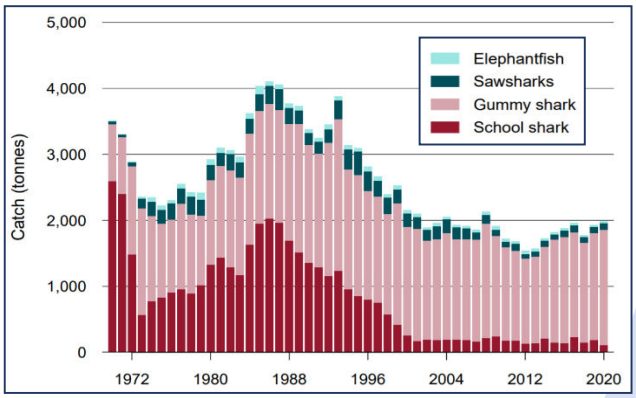


Figure 28. Catch in the Shark Gillnet and Shark Hook Sector by main species since 1970

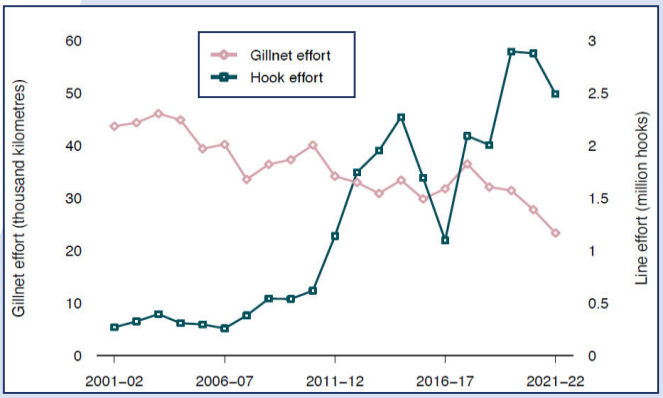


Figure 29. Gillnet and Hook line effort for the SHSGS from 2001-02 to 2021-22

SOUTHERN SQUID JIG FISHERY

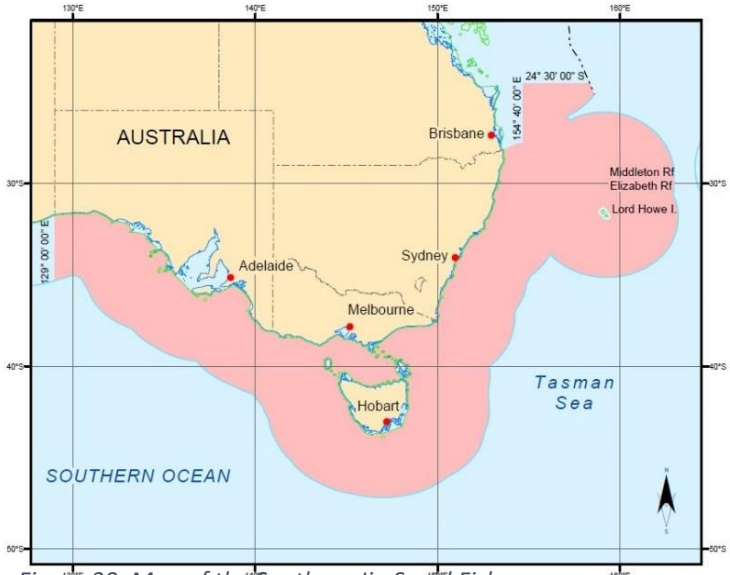


Figure 30. Map of the Southern Jig Squid Fishery

The Southern Squid Jig Fishery operates in Commonwealth waters off SA, VIC, TAS, NSW and parts off QLD (Figure 30), with most of the fishing effort occurring off the south-east of Australia. This fishery targets a single species — Gould's squid — using either hand operated or mechanically powered jigs.

Squid jigging typically occurs midwater at depths between 50 and 100 m at night using large lights that illuminate the waters around a boat. Once a suitable site has been chosen, it is common for vessels to deploy a drogue or sea anchor to reduce the vessel's drift while fishing

Effort in the sector was highest in the 1990's and early 2000s, with an average annual fishing effort of 8,878 jig hours between 1996 and 2005 (Figure 31). This declined to just 50 jig hours in 2014, and since the effort has fluctuated between 1,304 and 2,899 jig hours (Figure 31). Whilst the squid sector is unpredictable in nature wish boom and bust cycles the lowered effort in more recent years has been attributed to a combination of variable biomass and or/ stock availability, trouble locating stock, as well as high costs.

Fishing methods

- Squid jig

Figure 32. FV Del Richey 2, a Commonwealth Southern Squid Jig fishery vessel (20m aft wheelhouse vessel) (Source: Andrew Sullivan)

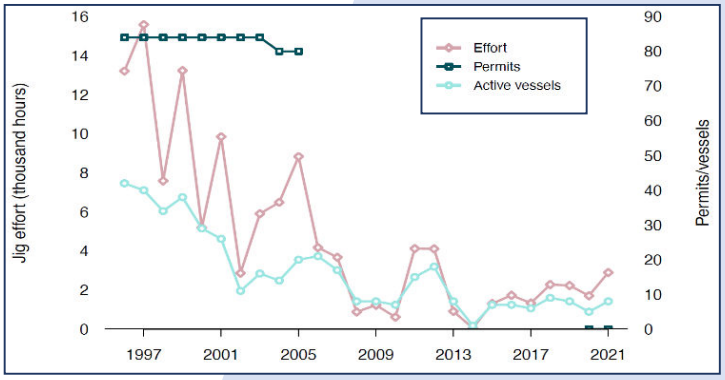


Figure 31. SJF effort and active vessels 1996 - 2021

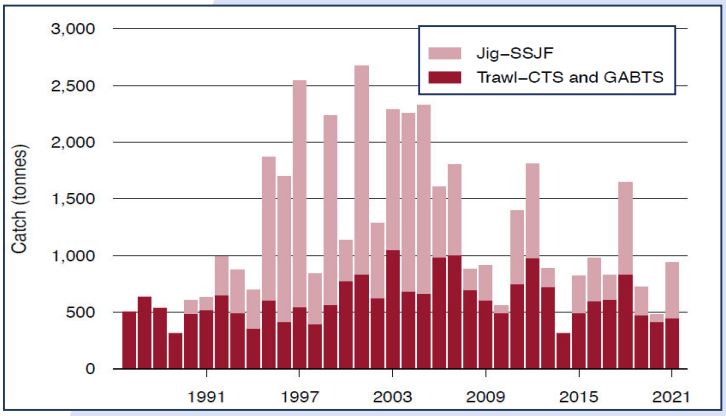


Figure 33. SSJF catch (tonnes), 1986 - 2021

OCEAN (GENERAL) FISHERY

The Victorian Ocean General Fishery is a mixed use multispecies fishery which extends throughout the states marine waters other than Port Philip Bay, Western Port Bay, Gippsland Lakes and any inlet of the sea. This fishery can land fish (mostly snapper, octopus and gummy shark) other than abalone, pipis, jellyfish, Southern Rock Lobster, Giant Crab, Commercial Scallop and sea urchins. The main management methods are input controls including limited access and gear restrictions. The fishery usually conducts day trips operating out of small vessels (<10 m), and may fish at anchor or underway.

Fishing methods:

- Line methods (dropline, long line, hand line)
- Dip and landing nets
- Fish traps
- Octopus traps
- Gaffs
- Seine nets
- Mesh nets
- Bait pumps

ROCK LOBSTER & GIANT CRAB FISHERY

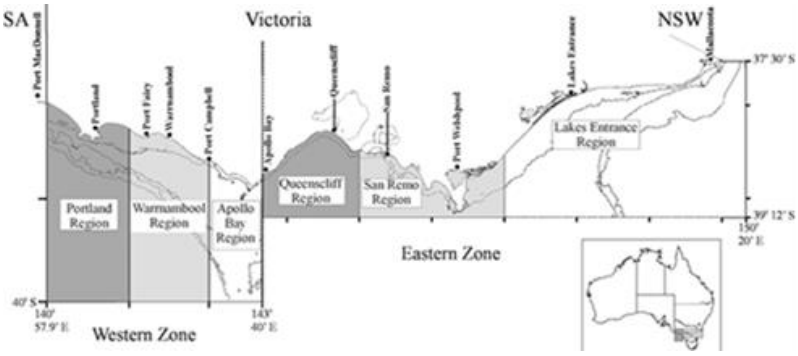


Figure 34. Map of the Rock Lobster and Giant Crab Fishery zones

The area of the Victorian Rock Lobster Fishery and the Giant Crab Fishery extends along the Victorian coast, out into Commonwealth waters (>3 nm offshore). The Rock Lobster fishery targets Southern Rock Lobster and is divided into two management zones (Eastern and Western, Figure 34), each managed through input and output controls, limited entry, gear restrictions, effort limits and a separate TAC. The fishing season is open from 16 November to 14 September each year. The Giant Crab Fishery targets the Giant Crab and is linked to the Rock Lobster Fishery, but is limited to the western zone. Only fishers who hold a Rock Lobster Fishery License can obtain a Giant Crab Fishery Licence, and both pot entitlements and quota are linked to their Rock Lobster licence.

Figure 35. Typical Rock Lobster vessel

Fishing method:

- Lobster / crab pots

ABALONE FISHERY

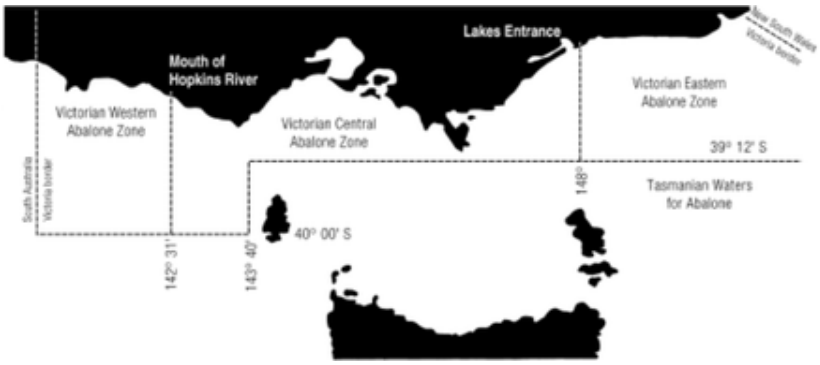


Figure 36. Map of the Abalone Fishery zones in Victoria

The abalone fishery in Victoria is one of the most valuable state managed commercial fishery, and is split into three zones for management, the Eastern Zone, Central Zone and Western Zone (Figure 36). Each zone has individual TACs, and SFR. In the Eastern zone there are 23 permits available and an annual TAC of blacklip abalone only. The Central and Western zones have 14 and 34 permits respectively and TACs for both blacklip and greenlip abalone. There are further restrictions on size limits which also apply to both species of abalone.

Abalone are caught by hand while diving, usually with the use of hookah breathing apparatus (see fishing methods. Abalone inhabit rocky reefs and are removed using an abalone knife. Boats used in the fishery are generally small (6–8m) and do not anchor while working. Abalone divers generally make single day trips. Abalone divers are generally restricted to depths less than 30 m.

Fishing method:

- Hand harvest

GIANT CRAB & ROCK LOBSTER FISHERY

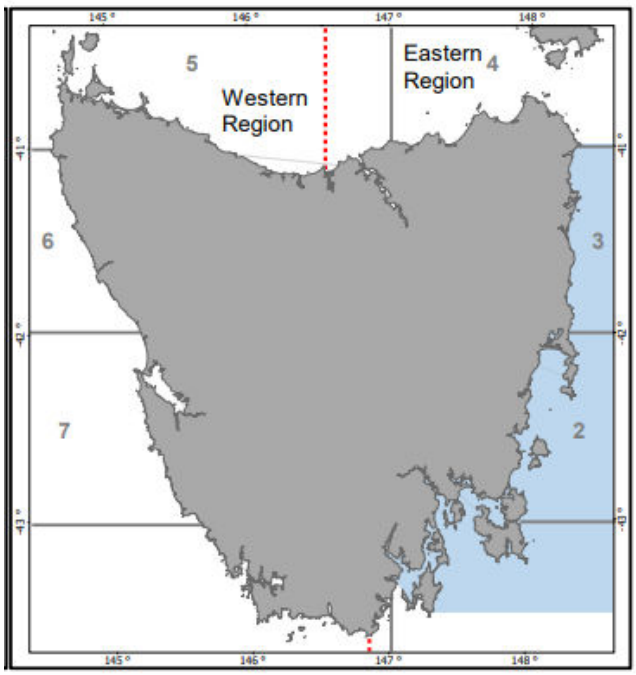


Figure 37. Tasmanian rock lobster fishery zones, Western and Eastern regions separated by red dotted line, assessment areas numbered, stock rebuilding areas shaded blue.

Whilst catch data, quota and seasons remain separate the regions and management areas are the same for Giant Crab and Rock Lobster in Tasmania. There are two broad regions; Eastern and Western, with eight management areas (Figure 37).

The Rock Lobster fishery targets Southern Rock Lobster managed through input and output controls, limited entry, gear restrictions, effort limits and a separate TAC. The fishing season differs each year, in 2020/21 opened on the 1st of November and closed on the 30th April. Annual catch has decreased from nearly 1,500 t in 2008–09, to just over 1000 t during the 2017–18 quota year (Figure 38). Percent of TAC caught dropped to 91% in 2010–11, but has since been about 98% with the exception of the 2019–20 season when the TAC was about 8.5% under caught. Most of the catch comes from 0–40 m depth, some catch is taken from as deep as 200 m.

Fishing method:

- Lobster pots / Crab pots

Figure 39. Typical Giant Crab and Rock Lobster vessel

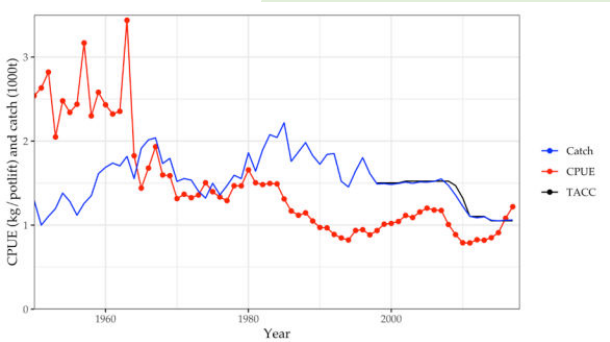
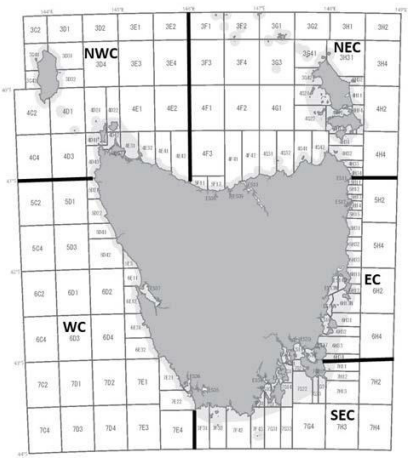


Figure 38. Annual catch, TAC and catch per unit effort (CPUE) of Southern Rock Lobster by the Tasmanian Rock Lobster Fishery since the inception of the ITQ system.

Giant Crab fishery is a small fishery with the annual TAC set at 20.7 tonnes, however, is high value at approximately $2 million in value. The fishery is managed by limited entry, gear restrictions, effort limits and a separate TAC. The fishing season differs each year and often mimics the Rock lobster season, however in 2023/24 Males will be open all year and Females will be open from 15 November to 31 May.

SCALEFISH FISHERY



More than 90 different species are reported in the TAS Scalefish Fishery catch logbook. Catch of scalefish has been declining since the late 1990s from about 1,300 t to 178 t in 2019–20 (Fraser, *et al*., 2021). Catch of cephalopods (mostly Southern Calamari and Gould's squid) has fluctuated annually, being as high as 1140 t in 2012–13 and as low as 27 t in 1996–97. Annual catch of small pelagics has also fluctuated largely from year to year. In 2008–09, 1,456 t of small pelagics (mostly Jack Mackerel and Redbait) was landed, while in 2018–19 only 0.4 t was landed. These numbers are likely from Danish seine, since there is no state licensed trawling. Shark catch has decreased from 1,221 t in 1995–96 to less than 20 t since 2007–08.

TRAWL

Otter board trawl

Otter board trawl can be performed either along the seabed (demersal trawling) or in the water column (midwater trawl) (Figure 40). Demersal trawling involves towing two otter-boards (boards) behind the fishing vessel using two long steel cables called *warps*. Warps are set and hauled using hydraulic net drums on the deck of the vessel. At the other end, each warp is attached to one of the otter-boards, which are large, rectangular steel *boards* that are attached at an angle designed to provide the outward force needed to spread (open) the mouth of the net. While being towed, otter-boards can spread as wide as 100–120m. The otter-boards connect to the net via sweeps and bridles, which act to herd the fish into the wings, then the mouth of the net and eventually to the cod-end. The trawl, the boards and the cable connecting the boards to the trawl (sweeps) all contact the bottom. The vertical opening of the mouth is maintained using floats on the headline. In demersal trawling the lower edge of the net is weighted and uses bobbins or rollers to help the net move across the seabed and protect it from damage.

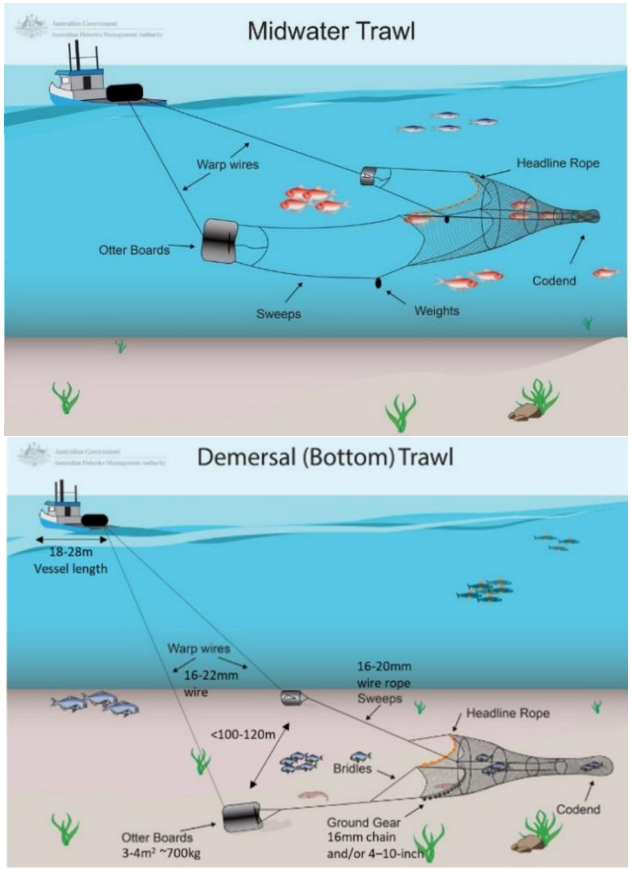


Figure 40. Demersal and midwater otter board trawl diagrams

SUROUNDING NETS

Danish seine

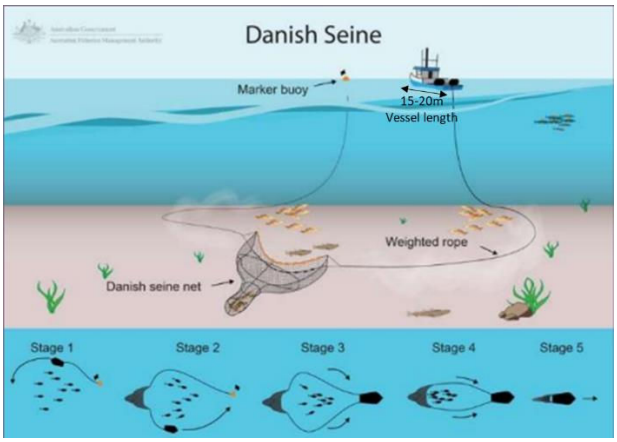


Figure 41. Danish seine diagram

Danish seine nets are conical in shape with two long wings, a bag where fish collect and warps that connect the net to the vessel and to surround an area fished (Figure 41).

The gear is set in a circle over relatively flat seabeds and hauled slowly back to the vessel, only moving about 1 nm (1.85 km) while it surrounds a large, pear-shaped area. A Danish seine shot usually lasts around 70 minutes and can be described by three distinct phases: setting, towing and retrieval. Danish seine vessels can complete eight or more shots in a day.

The setting phase of the Danish seine trawl takes longer duration than for an otter trawl. For the first ~45 minutes of the shot, the tow ropes and wings of the net are let out in a pear shape and the ropes and net sink to the sea floor; the codend only moves very slowly through the water during this phase. The shoulders and wings of the net are vertically aligned for the first 15 minutes, before becoming concaved as the ropes start to tighten and the ropes and net starts to move on the seabed. The towing phase is characterised by the ropes moving across the seabed, herding the fish into the path of the now moving codend. The wings of the net are bowed over, and are being pulled forwards, as well as being drawn in towards the opposite wing. As the retrieval phase begins, the net begins to lift off the sea floor and is then retrieved and emptied on board the towing boat.

Danish seine warps are initially 22 mm lead core rope with a breaking strain of 3.5 t but taper down to lighter 12 mm rope with a breaking strain of 1.7 t under the net, with the same 22 mm rope at the other end of the gear.

Most Danish seining occurs shallower than 100 m and is not a suitable method for working over rocky seabeds. By nature of the operation of Danish seining (i.e., the seine ropes are dragged along the ocean bottom) this method is at higher risk of becoming fast on seabed obstructions and is used to catch species that primarily occur on sandy/muddy bottom such as flathead and School Whiting.

Purse seine

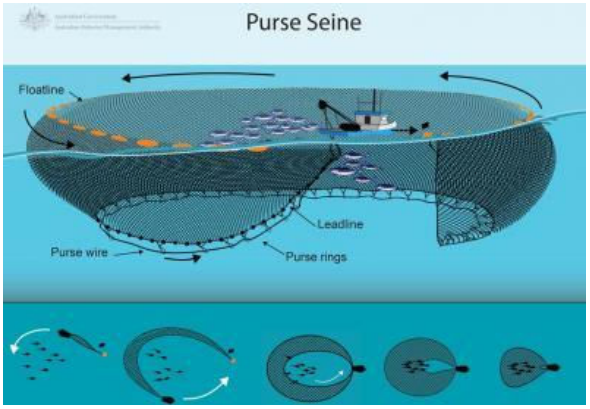


Figure 42. Diagram of purse seine fishing method

Purse seines are generally used to target schools of pelagic fish. A purse seine is comprised of a long wall of net framed by float line and lead line set in a circle to surround a school of fish. The bottom is then closed using wire threaded through the bottom of the net. Catch is brought onboard with the net, lifted out with small nets or pumped out. The fishing gear generally does not touch the sea floor.

PASSIVE NETS

Demersal gillnets

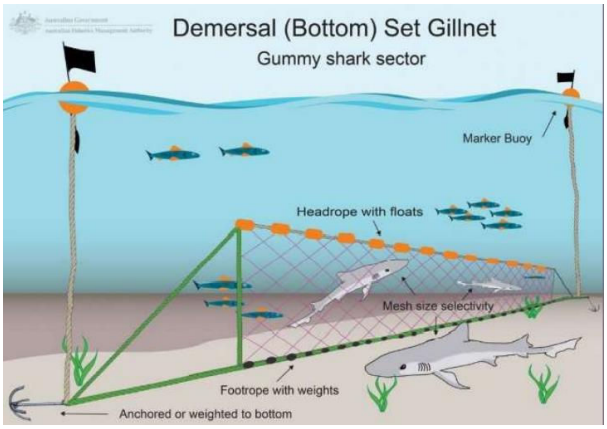


Figure 43. Diagram of demersal gillnet

Demersal gillnets are a passive fishing gear (i.e., they are not towed — the fish have to swim into the gear) comprising a series of long panels of diamond shaped mesh anchored at each end and weighted along the bottom rope to keep the net on the sea floor. It is held upright in the water column by a series of floats. They are sometimes referred to as mesh nets.

Gillnets generally have the headline (top horizontal rope) set 2 m above the seafloor. The headline is typically a 16 mm rope, as previously stated this is floated vertically using small floats. The monofilament net is connected to a ground rope on the lower horizontal edge. The ground rope is usually a 14 mm weighted (lead core) rope with a breaking strain of 1.4 t.

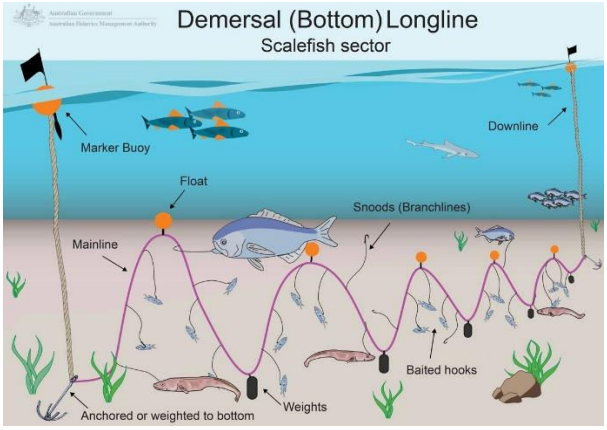
At either end of the gillnet, a 10 mm down-line with a breaking strain of 1.1 t runs from floats that indicate the position of the net on the surface, to 2.0 m of chain attached to a 100 kg J anchor or lead weights. Depending on tide and sea conditions there are often three or four other anchors set along the ground rope. The chain is attached to the anchor mid-way down the anchor shaft, and a lighter break-away cord is usually used.

Like trawl nets, gillnets are susceptible to snagging on rough bottom. However, they are not as sensitive to snagging as towed trawls, so although operators record all start and end tows on electronic navigational software, they generally have known safe areas (*grounds*) that they work.

Much like trawl fishing gillnet fishing is limited by marine parks, fishery closures, unfishable grounds, unproductive grounds and other closures. Gillnet fishing does not occur deeper than 183m (equivalent to 100 fathoms) because waters deeper than 183 m are closed by Commonwealth rules in order to limit catches of some deeper water fish stocks that are less productive than those targeted in shallower waters.

LINE METHODS

Demersal longline and auto longline



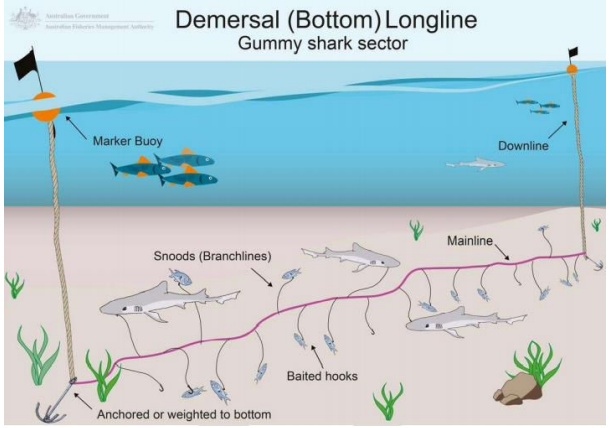


Figure 44. Demersal longline diagrams, scalefish (left), shark (right).

Bottom (demersal) longlines are set horizontally along the ocean floor and are held in place using anchors (Figure 44). There are two main methods used in the longline fishery: bottom longline fishing and auto longline fishing. The primary difference between bottom longline fishing and auto longline fishing is that hooks are baited by hand rather than a machine.

When set, the longline can be many kilometres in length (typically 1.5 – 5 km) and may have several thousand hooks. Bottom longline gear consists of a rope mainline with baited hooks spaced every 2 to 5 m on monofilament or braided cord snoods. The mainline is attached at both ends to downlines which have a large buoy on the surface for locating gear, and anchors at the bottom to hold the gear in place. Some vessels use radio beacons to be able to find gear in low visibility or if it drifts in heavy current. Each line is normally left to 'soak' for around 6 to 8 hours before being hauled. Hauling is done using hydraulic winches which are fixed to the deck of the boat. The gear can be hauled from either end by retrieving the downline.

Downlines (ropes connecting floats and the mainline) are generally made of 8 – 10 mm rope with a breaking strain of 0.8 to 1.1 t. Mainlines are thinner (e.g. 7 mm) but are more abrasion resistant. Snoods are usually monofilament with very low breaking strain (approximately 50 kg). Anchors are only large enough to manage onboard by hand (~15–25 kg). The number of anchors used depends on many factors including, currents, sea condition, ground fished, and species targeted. Bottom longline fishing causes very little disturbance to the sea floor and has only a very limited level of bycatch. Gear can become snagged on the bottom and get broken off, although this is not a common occurrence.

Like other fishing vessels, longliners may lay-up at anchor during bad weather or while fishing gear soaks (is deployed).

Auto-longlining is a variation of demersal longlining in which some of the functions (for example baiting the hooks) are automated. Many "autoliners" set, haul and steam between lines on a continual basis.

Bottom longlines and to a lesser extent auto-longlines are used to catch shark species that live on or near the sea floor in shelf waters generally less than 100 m deep. Although some auto-longlines and bottom longlines are used to target deep water species such as Blue Eye Trevalla and Pink Ling.

FISHING METHODS

Pelagic Longlining

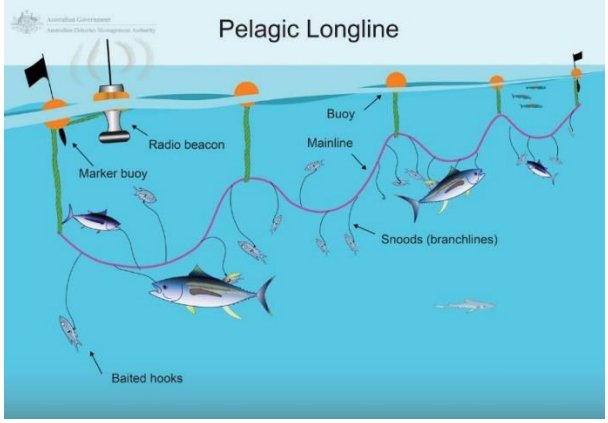
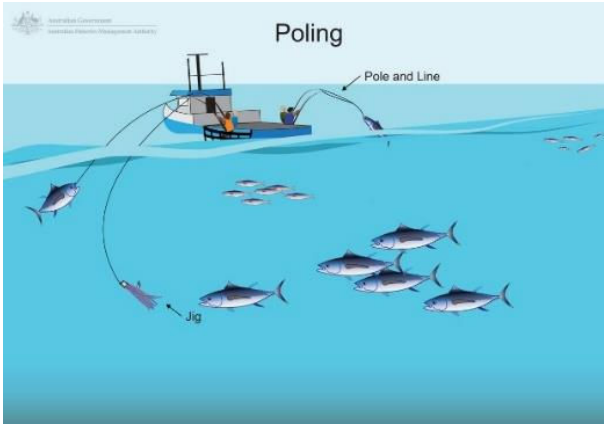


Figure 45. Pelagic longline diagram

Pelagic longline fishing is the main method used in the ETBF and involves the use of branch lines attached to a mainline (Figure 45). Each branch line (snood) has one or more baited hooks. The longline is set so that the mainline, branch lines and hooks are suspended in the water column by floats at the sea surface. By setting a different number of hooks between floats, longer float lines and varying line setter and boat speed, fishers can set gear at different depths in the water column allowing them to target different species. Radio beacons are attached to the longlines to make finding them for retrieval easier.

Minor line



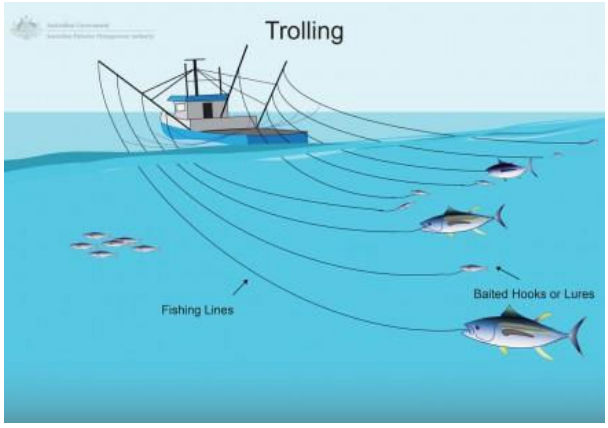


Figure 46. Polling (left) and Trolling (right) fishing method diagrams

Minor lines are general short lines with a small number of hooks (sometimes just one), and can be either in the form of poling or trolling. Trolling involves lures or baits attached to the hooks and are dragged behind the vessels at a slow speed, and may be reeled in. Poling is similar, however when a fish is caught on the hook it is flicked onto the boat, and is not reeled in.

Drop line

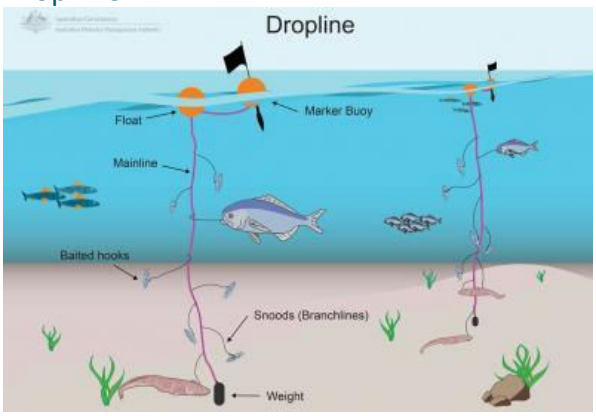


Figure 47. Diagram of dropline arrangement

Droplines consist of a mainline with a weight at the bottom and float at the top. Snoods, are off-shoots of monofilament from the main line which terminate in baited hooks. The number of hooks on each mainline varies but is typically between 20 to 100. Drop liens are left to soak for approximately 6 hours, and is hauled on deck by hydraulic winches.

The vessel size usually determines the number of lines set each day with larger vessels setting ten or more, whereas smaller vessels often only set 5 at most. Droplines can be used in shallow or deep water, but are typically used in depths from 250 – 600m.

FISHING METHODS

Hand lines

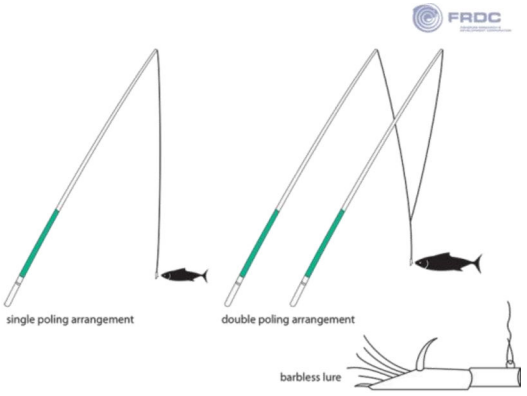


Figure 48. Illustration of typical hand line arrangement

Handlines are usually lowered and retrieved using fishing rod and reel equipped with 20 lb breaking strain monofilament of braided nylon mainline and 40 – 50 lb leader. Small 6 – 8 m vessels undertaking day trips, may anchor while fishing, and typically use a reef anchor attached to 3 – 5 m of chain (typically 8 mm link) and 12 mm polypropylene rope. Hand lines are used primarily to target finfish. By definition the gear consists of one or more baited hooks attached to a line which is deployed and retrieved by hand. Handlines may be attached to a rod, and may be mounted on the side of a vessel. They may be used singly or several at a time.

SCALLOP DREDGING

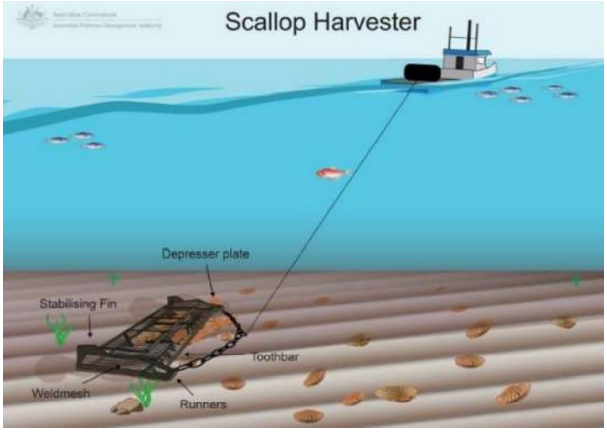


Figure 49. Diagram of scallop harvester

The average scallop vessel is 18 – 25 m long, weighs ~100 t, and is powered by 200–400 HP engines. Scallop dredges are a rigid steel cage that weigh about 600 kg. They have a tooth bar on the leading edge with teeth (tynes) that range 75 – 100 mm long, which penetrate the seabed (on muddy to coarse sand substrates) to depths to around 10 cm, depending on the compactness of the seabed, scooping scallops into the basket. The gear is towed along the seabed behind the vessel at a speed of ~3 to 5 knots using a 16–18 mm steel wire warp (6 x 19 ply) with a breaking strain of 15.3 to 19.3t.

Scallops sit either on top of the seabed, or semi-buried with just the upper valve exposed. Scallops are mobile and can swim short distances in response to stimuli in an attempt to escape the dredge.

HAND COLLECTION

Hand harvest methods usually involve divers collecting species by hand. Hookah equipment is often used. Hookah involves the diver receiving air from the surface (rather than a tank like in scuba), which allows them to stay underwater without breathing compressed air. Divers are often restricted to depths of 30m.

FISHING METHODS

SQUID JIGGING

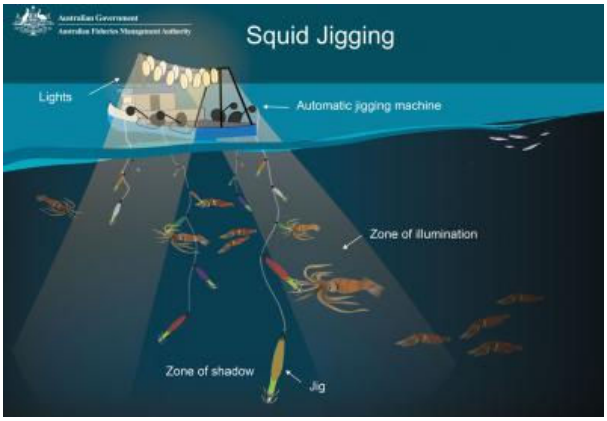


Figure 50. Diagram of squid jigging

The light attracts small marine creatures and in turn the squid are attracted to the concentration of these prey species. One or more lines of hooks are then jigged up and down in the water column using a rotating elliptical spool. The jigging devices are fully automated running on a timed cycle of setting, jigging and then hauling. Squid attack the jigs as they are being retrieved and become caught on the barbless hooks. As the squid are hauled onto the boat the barbless hooks allow them to easily fall off the jig into a holding container.

Squid jigs are used in the water column and do not interact with the seafloor. The line used for the squid jig is monofilament with a low breaking strain of 100 – 200kg. Jig vessels sometimes use anchors during the day (rest periods) that are typical of those described for other fisheries; 20-22mm rope with breaking strain of 4.7t.

POTS

Lobster and Crab pots

Figure 51. Diagram of lobster pot placement.

Lobster or Crab pots are designed in the form of cages, made from various materials (wood, wicker, metal rods, wire netting, plastic etc., Figure 52) and weighing about 40 kg. Pot size is regulated and must not be more than 150 cm long by 150 centimetres wide by 120 cm high.

Figure 52. metal, plastic and synthetic netting (left), and beehive pots (right) made from wood/wire.

Pots are usually set on rocky/hard bottom, normally set singularly and marked with a 3-strand 9-14 mm rope (14mm PP MBL 2.1t) and surface buoys. Pots are usually left to soak overnight, although on productive grounds they may be "pulled" at midnight and reset. Pots are hauled onboard using a mechanised rope-hauler, and some vessel may have a simple tipper arrangement for ergonomic and OH&S reasons.

4. FISHING METHOD RISK ASSESMENT

The results for the risk ranking of fishing methods (which are not jurisdictional) confirmed as actively present in the three AOIs are presented in Table 12. These Risk scores are based on four types of impulse attributable to:

1. Fishing vessel impact,
2. Vessel anchor drop impact,
3. Vessel anchor drag impact,
4. Descending fishing gear impact, and a Pulling force associated with snagged gear recovery.

Table 12. Risk ranking results for eight fishing methods (which are not jurisdictional) operating in the vicinity of the fishing data assessment area. The Risk Score was based on four types of impulse associated with vessel, equipment and fishing gear impacts and a pulling force associated with snagged gear recovery.

Fishing method	Risk Ranking	Risk Score (= T1 + T2 + T3 + T4 + PF)	Impulse Type 1 Vessel impact		Impulse Type 2 Anchor drop		Impulse Type 3 Anchor drag		Impulse Type 4 Gear drop impact		Pulling force Snagged gear recovery	
			Impulse (KN.s)	Relative Score [T1]	Impulse (N.s)	Relative Score [T2]	Impulse (N.s)	Relative Score [T3]	Impulse (N.s)	Relative Score [T4]	Max. (KN)	Relative Score [PF]
Demersal trawl	**1**	**5.00**	1,000	1.00	528	1.00	73	1.00	1400	1.00	283	1.00
Scallop dredging	**2**	**2.58**	625	0.63	87	0.16	19	0.26	1200	0.86	189	0.67
Cray/crab/GHaT pot&trap	**3**	**1.91**	750	0.75	260	0.49	43	0.59	14.25	0.01	20	0.07
Demersal gillnet	**4**	**1.82**	625	0.63	260	0.49	43	0.59	27.5	0.02	25	0.09
Jigging	**5**	**1.65**	750	0.75	167	0.32	31	0.42	-	-	46	0.16
Danish Seine	**6**	**1.63**	750	0.75	167	0.32	31	0.42	27.5	0.02	34	0.12
Demersal longline	**7**	**1.23**	750	0.75	87	0.16	19	0.26	27.5	0.02	11	0.04
Handline	**8**	**0.27**	123	0.13	8	0.02	9	0.12	0.4	<0.01	2	<0.01
Hand gather (diving)	**9**	**0.27**	123	0.13	8	0.02	9	0.12	-	-	-	-

4.1 Risk Review Methodology

The methodology followed is summarised below, for a full explanation of methodology see Appendix B.

4.1.1 Commercial fishing methods overlapping with the Beach AOIs

The results from the earlier sections identified that at least eight fishing methods operate in the vicinity of the Beach AOIs.

The ten fishing methods covered in the RA, together with the key representative vessel data for each method are presented below:

- Demersal trawl; typical vessel length 20m capable of 5 m/s
- Scallop dredger; typical vessel length 20m capable of 5 m/s
- Demersal gillnet; typical vessel length 20m capable of 5 m/s
- Danish Seine; typical vessel length 20m capable of 5 m/s
- Demersal longline; typical vessel length 20m capable of 5 m/s
- Squid jigging; typical commonwealth sector vessel used as representative vessel, 20m aft wheelhouse vessel, capable of 5 m/s
- Craypot; representative vessel of 20m displacement hull form, capable of 5 m/s
- Trolling; dedicated multi-hull trolling vessel used as representative vessel, length 8m, maximum speed 10m/s
- Handline; representative handlining vessel of 8m in length and capable of 10m/s
- Hand gathering; representative vessel 8m in length and capable of 10 m/s

4.1.2 Impulse Theory

To assess the potential physical impact that commercial fishing vessels, their fishing gear, as well as their anchor(s), may have on the Beach Energy infrastructure, the magnitude of the Impulse associated with each interaction (i.e., collision) was determined.

Impulse was seen an appropriate quantity to use in this instance since it contains the key variables governing the forces that may be produced (i.e., the body's mass and velocity) and is relatively simple to calculate. It provides a simple means to show in a relative context the different degree of severity associated with each interaction.

4.1.3 Impulse categories and Pulling Force definition

In relation to potential interactions between commercial fishing vessel/gear and Beach Energy infrastructure, a total of four different situations capable of causing a change in momentum (i.e., Impulse) were identified:

1. Impulse type 1 - fishing vessel collision
2. Impulse type 2 – vessel anchor drop impact
3. Impulse type 3 – vessel anchor drag impact
4. Impulse type 4 – descending fishing gear impact

Also considered in addition to the four forms of Impulse was a pulling force, the latter being associated with an operator trying to free up snagged fishing gear.

4.1.4 Impulse Interaction Assumptions and Approximations

To facilitate the Impulse calculation process certain assumptions and approximations were made regarding the interactions involving fishing vessels, fishing gear and anchor systems. These assumptions and approximations are presented in Appendix E.

4.2 Results and Discussion

The Impulse and Pulling Force results, together with the Risk score and Ranking, are presented in Table 12 above for each of the relevant fishing methods. Note the order of fishing methods is in descending order, with higher Risk scores and therefore Rankings at the top.

4.2.1 High risk fishing methods

Evidently, the larger vessels with more momentum, heavier anchors and utilising bulkier/heavier gear, namely demersal trawl and scallop dredge, posed the greatest risk of damaging Beach Energy infrastructure. Whereas smaller craft with less momentum, lighter anchors, and less bulky/heavier gears, such as handline and hand gathering posed the least risk. This outcome was very much governed by these three key characteristics, namely; vessel momentum, the mass of the vessel's anchor, and the momentum of the largest fishing gear ballast component.

4.2.2 Relative Risk score variation

The Risk scores showed great variation across the fishing methods assessed, with the risk scores ranging from 5 to 0.27 (Table 12). As stated above, the risk posed to Beach Energy infrastructure was heavily tied to the vessel size and speed, as well as the weight and momentum of the main equipment/gear components it deploys. Noteworthy was the three distinct groupings in overall risk score, namely Ranking 1-2, Ranking 3-7, and Ranking 8-10, which was largely dictated by the pulling force and gear drop impact associated with the representative fishing vessels used with that fishing method.

4.2.3 The type of interaction that poses the greatest risk

An analysis of the Impulse results for each fishing vessel/method revealed that Impulses associated with gear drop and snagged gear recovery, particularly of trawl and scallop dredge were much greater than the other forms of Impulse considered with 1400 and 1200 N.s respectively.

For the remainder of the fishing methods, vessel impact presented the greatest risk. The vessel induced Impulses also showed considerable variation across the ten fishing methods under consideration (1000 to 123KN.s), and this variation was primarily attributable to the variation in vessel size.

4.2.4 Pulling forces

The Pulling Force results (refer Table 10, far right column) showed that demersal trawl and scallop dredging with the heavier fishing year and stronger connecting rope and tackle between vessel and gear, had the greatest potential to damage Beach Energy infrastructure should the fishing gear become snagged. Vessels using other fishing gears with lighter connecting ropes to the vessel showed a substantial step-down in maximum pulling force.

5. NATURE OF THE COMMERCIAL FISHING INDUSTRY

5.1.1 Property rights

In Australia fishing rights generally exist in two forms:

1. The first is the *access right* which allows a fisher to access fishing grounds. Sometimes this is the only right in a fishery. Access rights vary in what they allow and are sometimes called licences, permits, concessions and statutory fishing rights.

2. The second fishing right, and this does not exist in all fisheries, is the right to take at set portion of the commercial catch for sale. This type of right is usually called a *quota right* (in the case of the Commonwealth system it is called a quota statutory fishing right). It is known as an output control. If quota management is not used as a management tool in a fishery the value of the rights will flow to the access right. Quota management is best practice in contemporary fishery management because it allows the Manager to limit catches to sustainable limits and/or economic goals. The alternative to output controls is to add operational inefficiencies such as limited net size, fishing times or vessel power to limit catch. As such, most fisheries developing now do so under an output control and usually this is a quota system. Many existing fisheries have introduced quota as a management tool. In Australia, most Commonwealth fisheries use quota as a management tool and many state-run fisheries have already moved, or are moving to, quota systems.

Fishing right values are determined by many factors (some of which have interwoven relationships) including but not limited to:

a. Revenue - market price, ease of catch, demand, variability of demand, competing products etc.
b. The cost to catch - distance from port to fishing grounds, availability of fishing grounds, fishing method, degree of stock aggregation, other fixed and variable costs.
c. Profit (a-b).
d. Biological risk - variation in the target stock.
e. Science - certainty bounds of the science, and the availability of data.
f. Environmental issues - social licence and the emergence of 3rd party sustainability accreditations.

Perhaps the clearest example of how reduced access to fishing grounds negatively impacts the fishing right occurred in the Commonwealth managed gillnet shark fishery. This fishery is managed using access and quota rights. Following a number of interactions between gillnet vessels from this sector with endangered Australian sea lions the fishery manager AFMA implemented a range of area closures totalling 18,500km^2 which prevented gillnets from being set in the areas of key sea lion habitat and in close proximity to breeding colonies (Figure 53). No data is available about the catch or revenue taken from within these closures but fishermen report that it was a significant fishing area. When grounds were closed, Gummy Shark became more difficult to catch (catch costs increased) and there were less fishermen (reduced demand) therefore lease prices dropped[15]. There was then a significant drop in catch (quota utilisation) and Gummy Shark quota capital value fell from more than $40,000/tonne to $30,000/tonne. Based on the size of the quota this represented a capital loss of approximately $20m (see Figure 54). Figure 54 also shows that this value drop occurred even through the retail price of gummy shark continued to climb.

[15] Fishermen either lease quota from the owners of quota, or own quota, in which case there's an internal transfer cost.

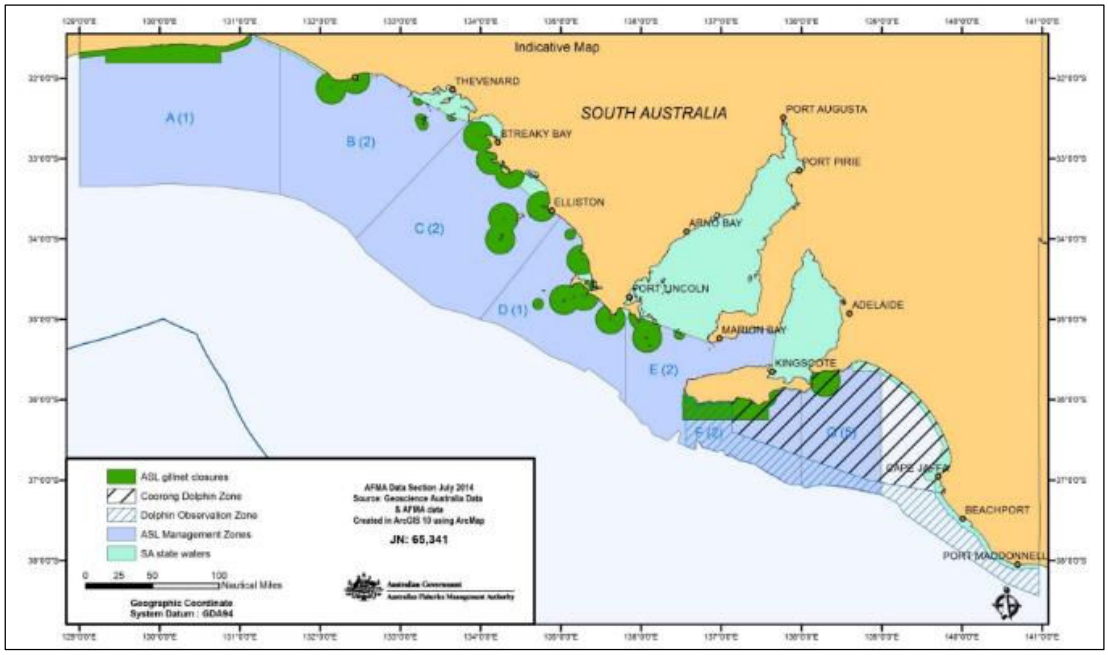


Figure 53. Gillnet closures for the protection on marine mammals in South Australia – Australian sea lion closures shown in green.

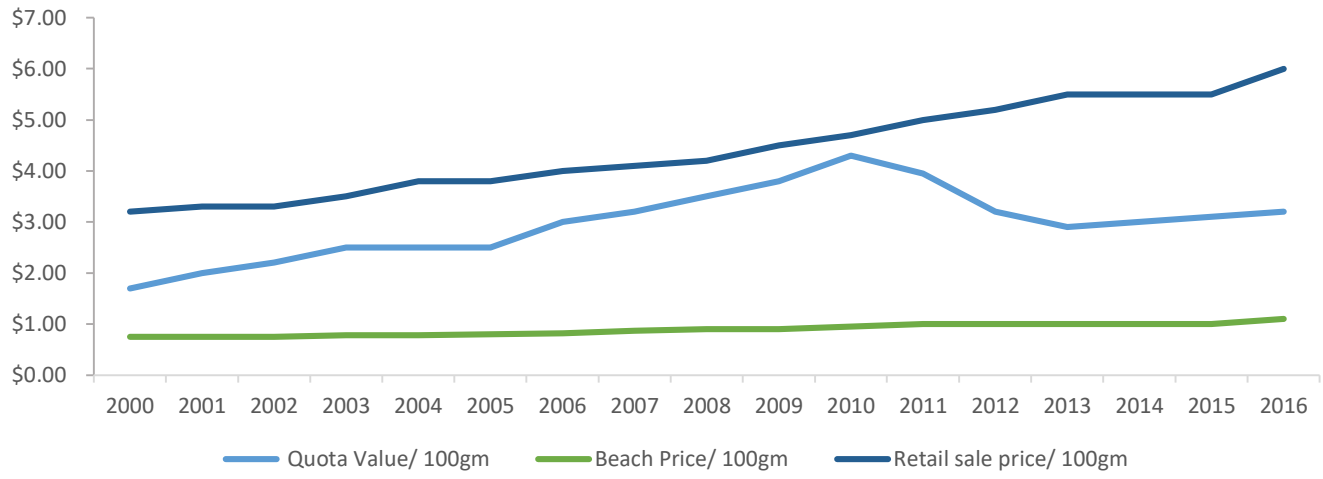


Figure 54. Gummy shark quota value, beach rice and retail price – all per 100g.

This example demonstrates the complex nature of fishing rights and why the value of all fishing rights in a fishery are likely to be negatively impacted by any restriction on these five factors; confidence in the right will decrease, fishers will not fish or will move to other fisheries and impacted fishing vessels will move to other areas (within the same fishery) increasing competition in those areas.

Fishers often mention consultation fatigue and the stress that uncertainty about the future of their business brings. Recent studies into the declining state of mental health in fishing communities called this *livelihood insecurity*. At its worst, impact on the fishery by the offshore exploration only represents a small displacement. However, fishers will want to know whether they are displaced and what compensation might, or might not, be payable as soon as possible.

5.1.2 Cumulative impact and reduced prospectivity

Commercial fishing methods that drag gear (active methods) are particularly sensitive to fuel price, under normal circumstances fuel can be 30% of the cost of running a board trawl vessel. The fishing industry is

facing record high fuel prices and they have doubled over the previous 12 months. As small businesses fishing companies do not hedge fuel price.

Beach Energy is not the only energy proponent expressing interest in marine areas. There are a number of declared and proposed renewable energy zones, including a large area off Gippsland, the *Gippsland Renewable Energy Zone*, and a proposed area to the west of Beach Energy's Otway region; the *Southern Ocean Offshore Renewable Energy Zone.* With these declarations, the most impacted fisheries are likely to be the Commonwealth's: Commonwealth Trawl Sector (CTS) and Gillnet, Hook and Trap Sector (GHaT). Several smaller fisheries managed by the Victorian authority will also likely be impacted.

6. FISHERIES STAKEHOLDER LIST

Table 13 provides a list of key contacts for representative bodies for each fishery identified as being legally able to fishing in the three AOIs.

Table 13. Key contacts for representative bodies for each affected sector.

FISHERIES	REPRESENTATIVE ORGANISATIONS	CONTACT NAME	PHONE NUMBER	KEY CONTACT EMAIL
All Australian wildcatch fisheries and aquaculture	Seafood Industry Australia (SIA)			
All Australian Commonwealth managed fisheries	Commonwealth Fisheries Association (CFA)			
SESSF Commonwealth Trawl Sector (CTS)	South East Trawl Fishing Industry Association (SETFIA)			
Southern Squid Jig Fishery (SSJF)	*No formal association*			
SESSF Shark Gillnet & Shark Hook Sector (GHaT)	Southern Shark Industry Alliance (SSIA)			
Bass Strait Central Zone Scallop Fishery (BSCZSF)	Bass Strait Scallop Industry Alliance			
Victorian Rock Lobster Fishery	Sub-committee of SIV			
Victorian Rock Lobster Fishery	Eastrock			
All Victorian Fisheries	Seafood Industry Victoria (SIV)			
All Tasmanian Fisheries	Tasmanian Seafood Industry Council			

[16] Significant stakeholder who has agreed to release her details.

APPENDIX A – BEACH PRICES

Table 14. Beach prices used in value calculations

CAABcode	SpeciesName	CommonName	Beach Price 2018 $/kg	Beach Price 2022 $/Kg
37224900	Lotella & Pseudophycis spp	A Morid Cod	10.56	10.56
37441005	Thunnus alalunga	Albacore	2.99	2.99
37258002	Beryx splendens	Alfonsino	2.55	2.55
37024000	Squatinidae	Angel Sharks	4.95	
37114013	Alepocephalus antipodianus	Antipodean Slickhead	0.34	0.34
37024001	Squatina australis	Australian Angelshark	2.12	4.95
37441020	Sarda australis	Australian Bonito	5.58	5.58
37259001	Cleidopus gloriamaris	Australian Pineapplefish	0.33	0.33
37085002	Sardinops neopilchardus	Australian Sardine	2.90	2.90
24207000	Volutidae - undifferentiated	Bailer shells	11.00	11.00
37377006		Banded Morwong	3.85	3.85
37439001	Thyrsites atun	Barracouta	1.34	1.34
37378002	Latridopsis forsteri	Bastard Trumpeter	3.96	3.96
37326901		Bigeyes (mixed)	2.20	2.20
37258004	Centroberyx gerrardi	Bight Redfish	4.15	4.15
37367004	Pentaceros decacanthus	Bigspine Boarfish	4.91	4.91
37353003	Acanthopagrus butcheri	Black Bream	6.64	6.64
37254001	Diretmichthys parini	Black Spinyfin	2.51	2.51
37337053	Caranx lugubris	Black Trevally	4.31	4.31
37288012	Satyrichthys cf moluccense	Blackfin armour gurnard	4.73	4.73
37367005	Zanclistius elevatus	Blackspot Boarfish	4.91	4.91
37120001	Paraulopus nigripinnis	Blacktip Cucumberfish	2.25	2.25
37255001	Hoplostethus intermedius	Blacktip sawbelly	2.71	2.71
37018901		Blacktip shark (mixed)	7.15	7.15
37227001	Macruronus novaezelandiae	Blue Grenadier	3.75	3.75
37441001	Scomber australasicus	Blue Mackerel	2.24	2.24
37377004	Nemadactylus valenciennesi	Blue Morwong	3.85	3.85
37018004	Prionace glauca	Blue Shark	0.72	0.72
37445005	Seriolella brama	Blue Warehou	3.36	3.36
37445001	Hyperoglyphe antarctica	Blue-eye Trevalla	8.99	8.99
37355001	Upeneichthys lineatus	Bluestriped Goatfish	6.91	6.91
37367000	Pentacerotidae - undifferentiated	Boarfishes	4.91	4.91
37020003	Deania calcea	Brier Shark	2.82	2.82
37005002	Notorynchus cepedianus	Broadnose Shark	1.32	4.00
37018001	Carcharhinus brachyurus	Bronze Whaler	1.10	1.10
28821000	Scyllaridae	Bugs - Shovel nosed & slipper lobsters	18.70	18.70
37018021	Carcharhinus leucas	Bull Shark	2.20	2.20
37288007	Lepidotrigla vanessa	butterfly gurnard	2.20	2.20
37288901		Butterfly gurnard (mixed)	2.20	2.20
37311002	Caesioperca lepidoptera	Butterfly Perch	1.48	1.48
23617000	Loliginidae - undifferentiated	Calamari	2.02	2.02
37327000	Apogonidae, Dinolestidae	Cardinalfishes	1.10	1.10
28730000		Carid prawns	6.60	6.60
23270007	Pecten fumatus	Commercial Scallop	2.43	2.43
37287005	Neosebastes scorpaenoides	Common gurnard perch	3.94	3.94
37337002	Trachurus declivis	Common Jack Mackerel	1.15	1.15
37063003	Muraenesox bagio	Common Pike Eel	6.06	6.06
37023002	Pristiophorus cirratus	Common Sawshark	2.53	4.00
37269001	Metavelifer multiradiatus	Common Veilfin	1.10	1.10
37067000	Congridae	Conger eels	4.95	4.95
37345003	Plagiogeneion rubiginosus	Cosmopolitan Rubyfish	4.50	4.50
28850000		Crabs	4.40	4.40
23607901	Sepia spp	Cuttlefish (mixed)	1.69	1.69
37255004	Gephyroberyx darwinii	Darwin's roughy	3.47	3.47
37297001	Hoplichthys haswelli	Deepsea Flathead	5.18	5.18

37020906	Centroscymnus spp	Deepwater Dogfishes unspecified	1.65	1.65
37296002	Neoplatycephalus conatus	Deepwater Flathead	4.95	4.95
37020000	Centrophoridae, Dalatiidae, Squalidae, Somniosidae & Etmopteridae - undifferentiated ..	Dogfishes	2.20	2.20
37015001	Cephaloscyllium laticeps	Draughtboard Shark	1.15	4.00
37296004	Platycephalus fuscus	Dusky Flathead	5.90	5.90
37377005		Dusky Morwong	3.85	3.85
37018003	Carcharhinus obscurus	Dusky Whaler	3.63	3.63
37384043		Eastern Blue Groper	4.40	4.40
37311001	Lepidoperca pulchella	Eastern Orange Perch	7.19	7.19
37330014	Sillago flindersi	Eastern School Whiting	2.00	3.75
37043001	Callorhinchus milii	Elephantfish	1.46	4.00
37351902		Emperor	5.50	5.50
37020001	Centrophorus moluccensis	Endeavour Dogfish	3.27	3.27
37027999		Fiddler Rays Unspecified	1.32	1.32
37999999		Fish (mixed)	1.10	1.10
37296000		Flatheads	6.00	6.00
37990009		Flounders (mixed all types)	2.20	2.20
37440002	Lepidopus caudatus	Frostfish	3.24	3.24
37439002	Rexea solandri	Gemfish	3.92	3.92
37042000	Chimaeridae - undifferentiated	Ghostsharks	2.53	2.53
37367002	Paristiopterus labiosus	Giant Boarfish	0.79	0.79
28915002		Giant Crab	18.68	18.68
28712008	Aristaeopsis edwardsiana	Giant Scarlet Prawn	5.32	5.32
23636004	Nototodarus gouldi	Gould's Squid	2.03	4.50
37020007	Squalus mitsukurii	Greeneye Dogfish	1.46	1.46
37377002	Nemadactylus douglasii	Grey Morwong	4.85	4.85
37026000	Rhinidae, Rhynchobatidae - undifferentiated	Guitarfishes unspecified	2.20	2.20
37017001	Mustelus antarcticus	Gummy Shark	7.21	10.50
37019000		Hammerhead sharks	2.20	2.20
37311006	Polyprion oxygeneios	Hapuku	8.78	8.78
37311902	Polyprion americanus & Polyprion oxygeneios	Hapuku and Bass Groper	3.30	3.30
37258001	Beryx decadactylus	Imperador	12.37	12.37
37377003	Nemadactylus macropterus	Jackass Morwong	3.03	3.03
37264004	Zeus faber	John Dory	7.01	7.01
37264001	Cyttus traversi	King Dory	6.19	6.19
37330001	Sillaginodes punctata	King George Whiting	15.12	15.12
37377014		King Morwong	3.85	3.85
37369002	Oplegnathus woodwardi	Knifejaw	1.96	1.96
37122000		Lanternfishes	1.10	1.10
37440004	Trichiurus lepturus	Largehead Hairtail	7.51	7.51
37288006	Pterygotrigla polyommata	Latchet	1.68	1.68
37465000	Balistidae, Monacanthidae - undifferentiated	Leatherjackets	1.57	1.57
37311095	Caprodon longimanus	Longfin Perch	9.18	9.18
37326002	Cookeolus japonicus	Longfinned bullseye	3.74	3.74
37367003	Pentaceropsis recurvirostris	Longsnout boarfish	4.35	4.35
37020004	Deania quadrispinosa	Longsnout Dogfish	3.22	3.22
37361007	Girella tricuspidata	Luderick	1.41	1.41
37441911	Scombridae spp	Mackerel (mixed)	0.55	0.55
37377001		Magpie Perch	2.20	2.20
37229003	Carapus rendhali	Messmate fish	2.13	2.13
37264003	Zenopsis nebulosus	Mirror Dory	2.94	2.94
37465003	Eubalichthys mosaicus	Mosaic leatherjacket	1.32	1.32
37354001	Argyrosomus hololepidotus	Mulloway	6.38	6.38
37272002	Regalecus glesne	Oarfish	0.98	0.98
37445014	Schedophilus labyrinthica	Ocean Blue-eye Trevalla	8.99	8.99
37465006	Nelusetta ayraudi	Ocean Jacket	1.57	1.57

23659000	Octopodidae - undifferentiated	Octopuses	1.10	1.10
37439003	Ruvettus pretiosus	Oilfish	1.62	1.62
37255009	Hoplostethus atlanticus - Cascade Plateau	Orange Roughy	5.25	5.25
37266902	Neocyttus rhomboidalis, N. psilorhynchus, Allocyttus niger & A. verrucosus	Oreodories (mixed)	3.30	3.30
37024002	Squatina tergocellata	Ornate Angelshark	2.12	2.12
37266002	Oreosoma atlanticum	Oxeye Oreodory	3.63	3.63
37020036	Somniosus pacificus	Pacific Sleeper Shark	1.35	1.35
37020006	Squalus megalops	Piked Spurdog	3.43	3.43
37228002	Genypterus blacodes	Pink Ling	8.50	8.50
37020905	Deania calceus & Deania quadrispinosa	Platypus Sharks (mixed)	3.21	3.21
37010004	Lamna nasus	Porbeagle	1.34	1.34
37007001	Heterodontus portusjacksoni	Port Jackson Shark	2.20	2.20
37337029	Elagatis bipinnulata	Rainbow Runner	3.15	3.15
37342001	Brama brama	Ray's Bream	4.15	4.15
37224006	Pseudophycis bachus	Red Cod	3.96	3.96
37288001	Chelidonichthys Kumu	Red Gurnard	2.42	2.42
37377009	Cheilodactylus fuscus	Red Morwong	17.06	17.06
37345001	Emmelichthys nitidus	Redbait	1.06	1.06
37345901		Redbait (mixed)	4.40	4.40
37258003	Centroberyx affinis	Redfish	3.20	3.20
37287001	Helicolenus percoides	Reef Ocean Perch	3.99	3.99
37224002	Mora moro	Ribaldo	2.72	2.72
37367009	Pseudopentaceros richardsoni	Richardsons Boarfish	4.40	4.40
37296006	Platycephalus laevigatus	Rock Flathead	5.72	5.72
37228008	Genypterus tigerinus	Rock ling	5.79	5.79
37311901	Aethaloperca & Anyperodon spp	Rockcod	11.00	11.00
37264010	Cyttopsis rosea	Rosy Dory	2.72	2.72
37020904	Centroscymnus, Centroselachus, Deania & Scymnodon	Roughskin Dogfishes (mixed)	1.65	1.65
28714005	Haliporoides sibogae	Royal Red Prawn	2.67	2.67
37346014	Etelis carbunculus	Ruby Snapper	4.49	4.49
37345900	Plagiogeneion spp	Rubyfish (mixed)	9.90	9.90
37445004	Centrolophus niger	Rudderfish	2.87	2.87
37337007	Seriola hippos	Samson Fish	1.14	1.14
37008003	Odontaspis ferox	Sandtiger Shark	1.06	1.06
37023000	Pristiophoridae - undifferentiated	Sawsharks	2.53	4.00
37017008	Galeorhinus galeus	School Shark	5.65	10.50
37117001	Aulopus purpurissatus	Sergeant Baker	1.14	1.14
37990003		Sharks (mixed)	2.86	2.86
23999999		Shells	7.04	7.04
37010001	Isurus oxyrinchus	Shortfin Mako	1.67	4.00
37264002	Cyttus australis	Silver Dory	2.11	2.11
37337062	Pseudocaranx dentex	Silver Trevally	3.68	3.68
37445006	Seriolella punctata	Silver Warehou	2.29	2.29
37005000		Sixgill & Sevengill sharks unspecified	3.30	3.30
37031000	Rajidae, Arhynchobatidae - undifferentiated	Skates	1.82	1.82
37990018	Skates & rays - undifferentiated	Skates and rays	1.82	1.82
37441003	Katsuwonus pelamis	Skipjack Tuna	3.69	3.69
37020014	Isistius brasiliensis	Smalltooth Cookiecutter Shark	0.63	0.63
37278001	Fistularia commersonii	Smooth Flutemouth	2.12	2.12
37019004	Sphyrna zygaena	Smooth Hammerhead	1.43	1.43
37266003	Pseudocyttus maculatus	Smooth Oreodory	3.94	3.94
37305001	Psychrolutes marcidus	Smooth-head Blobfish	0.48	0.48
37353001	Pagrus auratus	Snapper	6.83	6.83

37990015		Sole (mixed)	2.20	2.20
37441004		Southern Bluefin Tuna	14.50	14.50
37296037	Platycephalus speculator	Southern Bluespotted Flathead	4.19	4.19
23617005		Southern calamari	2.02	2.02
37039001	Myliobatis australis	Southern Eagle Ray	1.82	1.82
37227002	Merluccius australis	Southern Hake	2.63	2.63
37287008	Scorpaena papillosa	Southern Red Scorpionfish	3.96	3.96
37271001	Trachipterus arawatae	Southern Ribbonfish	1.71	1.71
37279001	Jasus (Jasus) edwardsii	Southern rock lobster*	89.82	87.51
37296003	Platycephalus bassensis	Southern Sand Flathead	4.40	4.40
37023001		Southern Sawshark	2.53	4.00
37266001	Neocyttus rhomboidalis	Spikey Oreodory	2.85	2.85
37311055	Callanthias australis	Splendid Perch	9.18	9.18
23615000		Squids	5.61	4.50
37400000	Uranoscopidae - undifferentiated	Stargazers	0.55	0.55
37035000		Stingrays	1.65	1.65
37378001	Latris lineata	Striped Trumpeter	6.00	6.00
37258005	Centroberyx lineatus	Swallowtail	2.41	2.41
37442001	Xiphias gladius	Swordfish	6.70	6.70
37334002	Pomatomus saltatrix	Tailor	6.19	6.19
37353013	Rhabdosargus sarba	Tarwhine	6.60	6.60
37445002	Tubbia tasmanica	Tasmanian Rudderfish	2.87	2.87
37311000		Temperate Basses & Rockcods	9.90	9.90
37287006	Neosebastes thetidis	Thetis Fish	0.88	0.88
37012001	Alopias vulpinus	Thresher Shark	1.34	4.00
37296001	Neoplatycephalus richardsoni	Tiger Flathead	6.55	6.55
37018022	Galeocerdo cuvier	Tiger Shark	0.94	4.00
37445000		Trevallas	8.99	8.99
37337000		Trevallies and Scads	2.20	2.20
37228001	Dannevigia tusca	Tusk	11.32	11.32
37384001	Bodianus vulpinus	Western Blackspot Pigfish	23.09	23.09
37232000		Whiptails	1.10	1.10
37017003	Furgaleus macki	Whiskery Shark	1.94	1.94
37445011	Seriolella caerulea	White Warehou	2.53	2.53
37015013	Cephaloscyllium sp	Whitefin Swellshark	1.10	1.10
37020008	Squalus acanthias	Whitespotted Spurdog	2.34	2.34
37013000	Brachaeluridae & related families - undifferentiated	Wobbegongs blind nurse carpet & zebra	4.40	4.40
37441002	Thunnus albacares	Yellowfin Tuna	8.80	8.80
37367001	Paristiopterus gallipavo	Yellowspotted Boarfish	4.42	4.42
37337006	Seriola lalandi	Yellowtail Kingfish	6.44	6.44

*Rock lobster calculations are based on Victorian landed prices

APPENDIX B – RISK REVIEW METHODOLOGY

The methodology followed is outlined below:

1. Present the commercial fisheries and associated fishing methods that overlap with the Beach infrastructure
2. Explain why Impulse is an appropriate parameter to assess the danger/risk in this situation
3. Categorise the various Impulse situations associated with specific types of interactions
4. Present the simplifications, assumptions and approximations used in the analysis
5. Assemble the necessary data (mass, velocity change and interaction duration) on vessel, gear, and anchor, for Impulse determination
6. Complete the Impulse calculations and present the results in an appropriate format
7. Discuss the findings and formulate conclusions

Impulse Theory

To assess the potential physical impact that commercial fishing vessels, their fishing gear, as well as their anchor(s), may have on Beach infrastructure in the fishing data assessment area, the magnitude of the Impulse associated with each interaction (i.e., collision) was determined.

Impulse was seen an appropriate quantity to use in this instance since it contains the key variables governing the forces that may be produced (i.e., the body's mass and velocity) and is relatively simple to calculate. It provides a simple means to show in a relative context the different degree of severity associated with each interaction.

The Impulse-Momentum theorem states that a body's momentum change is proportional to the impulse applied to it (Elert 1998).

The change in momentum (Δp) is determined with equation [1].

$$\text{Change in momentum } (\Delta p) = M \times \Delta v \qquad [1]$$

The key variables being mass (M) of the body involved in the interaction and the change in velocity (Δv) of that body during the interaction period. Note: the subscript M_v, M_g, and M_a was used for vessel, fishing gear or anchor respectively.

The impulse (J) is determined with equation [2].

$$\text{Impulse } (J) = F \times \Delta t \qquad [2]$$

The key variables in this case are average net force (F) and the duration that this force acts (Δt).

The units for Δp and J are therefore kg.m.sec^{-1} and N.s

Note that both Δp and J are vector quantities due to the presence of the Δv and F vector quantities in equations [1] and [2] respectively, and since these equations are dimensionally similar, it is possible to equate the RHS of equation [1] and [2] to show the key variables of this Impulse-Momentum relationship.

$$F \times \Delta t = M \times \Delta v \qquad [3]$$

Noting that if the data for the three key variables, namely Δt, M, and Δv, are available then the Impulse (J), as well as the average net force (F) responsible for the change in momentum, can be determined.

Impulse categories and calculation methodology

In relation to interactions between commercial fishing vessel/gear and Beach infrastructure, a total of four different situations capable of causing a change in momentum (i.e., Impulse) were identified:

1. Impulse type 1 – vessel only collision
2. Impulse type 2 – vessel anchor drop impact
3. Impulse type 3 – vessel anchor drag impact
4. Impulse type 4 – descending fishing gear component collision

Impulse type 1 – vessel only collision

This interaction was about gauging the maximum Impulse that a vessel may impart to Beach surface structure should a collision occur. To simplify the calculation, all vessels were assumed to be travelling at constant velocity (v) prior to the collision, and subsequently came to a standstill over the same distance (i.e., 1m) and time period (t) (i.e., 1 second).

By making the change in momentum occur over the same time period, the resultant net average force (refer Equation [3]) was kept relative between vessels. Noting that this may not always be the case due to differences in vessel construction, operator reaction time, collision characteristics, amongst other things.

Impulse type 2 – vessel anchor drop impact

This interaction was concerned with determining the maximum Impulse that an anchor deployed from a fishing vessel may impart to Beach infrastructure on the seabed (e.g., submarine cable or mooring). The key variables in this case were anchor mass (M_a), the velocity of the descending anchor (v) and the deceleration period (t) (i.e., to determine the average net force).

For this assessment every anchor was assumed to reach a terminal velocity prior to impact and to have a similar deceleration period of one second, with the magnitude of the velocity governed by the anchor's mass (M_a), drag coefficient (CD) and projected area (A).

$$\text{Terminal velocity} = [(M_a \times g)/(CD \times 0.5 \times p_w \times A)]^{0.5} \qquad [4]$$

where

g = gravitational constant i.e., 9.81 $m.s^{-2}$

p_w = mass density of seawater at 1025 $Kg.m^{-3}$

To simplify the analysis each anchor was assumed to be of the stockless type (since admiralty 'stock' type anchors are rarely used nowadays) and geometrically similar despite the possible variation in design (refer Fig. 5.), with a similar drag coefficient of 0.9 based on a stockless anchor (Woo & Na 2014). According to Woo & Na (2014), the influence of Reynolds number and initial velocity on this drag coefficient was negligible, which supports the above simplification.

The projected area used was based on two circular cross-sectional rods of similar dimensions (length /diameter = 4) and aligned so that the two rods intersect at 90° to form a T-shaped anchor. The anchor was assumed to descend as an inverted T through the water i.e., the projected area was equivalent to the product of a single rod's length and diameter. To find the key variable in this instance, namely the rod diameter (d), the volume (V) was firstly found using the required mass (Ma) and equation [5], and then the rod diameter was found using the rearranged form of equation [6]. Lastly, the projected area (A) was deduced using equation [7], that being the area of a single horizontal rod at 90° to the relative flow.

$$Ma = V \times p_s \quad [5]$$

where p_s = mass density of steel at 7400 $Kg.m^{-3}$

$$V_{rods} = 2 \times L \times (\pi \cdot d^2)/4$$

or in this case where L = 4d

$$= 2 \times 4d \times (\pi \cdot d^2)/4 \quad [6]$$

Rearranging to find d

$$d = (V_{rods}/2\,\pi)^{1/3}$$

$$A_{rod} = L \times d$$

or in this case where L = 4d

$$= 5d \quad [7]$$

Anchor mass requirement for a given vessel can be determined with the Equipment Number, Holding Power and Anchor Mass formulas provided by National Standard for Commercial Vessels Part C, Design and Construction, Subsection 7D – Anchoring Systems (refer Appendix C).

Alternatively, Tables provided for each Class of vessel can be used (refer Appendix D). Commercial fishing vessels fall under Class 3. For the area of interest, the category would be mostly C, making most of the commercial fishing vessels in this area a Class 3C vessel, or 3C restricted vessel if venturing further offshore.

For this investigation, a nominal anchor mass was assigned to each type of fishing vessel based on its assigned length and by using data in Tables prescribed by AMSA (refer Appendix E) to generate the following relationship between vessel length and anchor mass; $M_a = 0.0247 \times L^{2.8597}$

Note, in the derivation of this formula the corresponding height for each vessel was assumed to be 1/5th of the vessel's length (i.e., a L:H ratio of 5:1 was used).

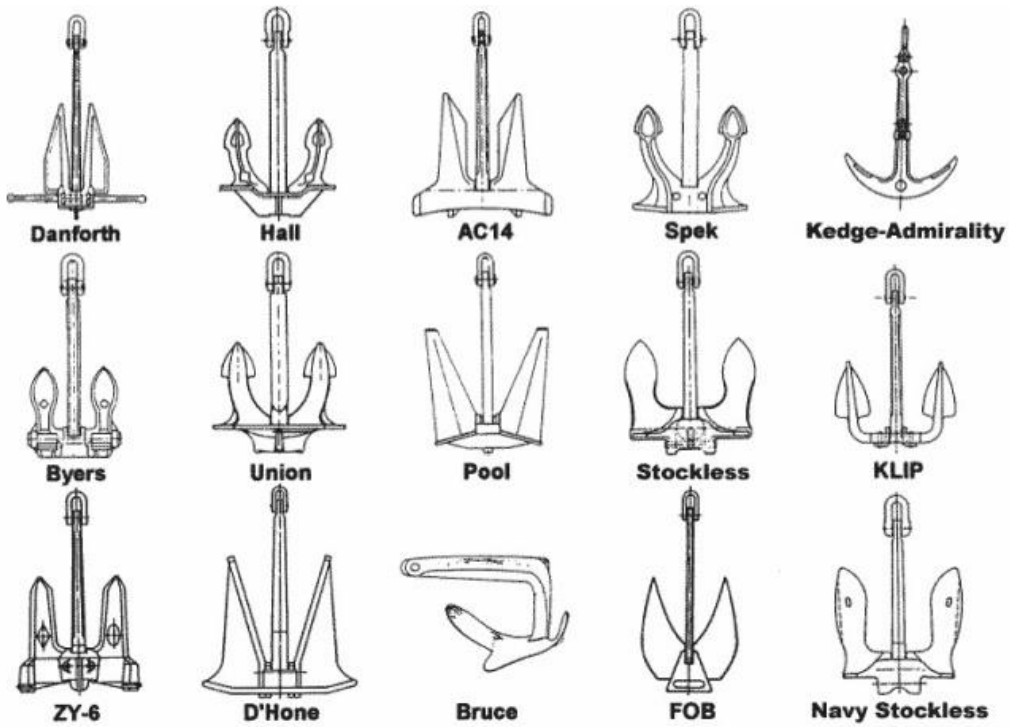


Figure 55 Types of Stockless anchor (source: www.gratitudesailingnw.com/sailing-lessons.html)

Impulse type 3 – vessel anchor drag impact

This interaction was about gauging the maximum Impulse that a dragging anchor may impart to Beach infrastructure on the seabed (e.g., a pipeline). For this assessment, all anchors were assumed to be dragging at similar constant velocity (v) prior to the collision, and subsequently came to a standstill over the same distance and time period (t). By making the change in momentum (mass x velocity) occur over the same time period, the resultant average net force caused by the impulse was kept relative to differences in anchor mass (M_a) (refer equation [3]). Noting that for various reasons, such as how much the farm component may shift during the interaction, this may not always be the case in reality.

To assign a representative anchor drag speed to this situation tidal current data from nearby environmental current meters in 47 and 70m water depth (refer Appendix F) was analysed together with wind speed data from the Bureau of Meteorology. Tidal current was found to be reasonably low, whereas surface generated current from wind coupled with the drag this wind imposes on the above water portion of a vessel could at times be very high. So much so that most craft would be making for sheltered waters, which was not far away in this case. With this in mind an anchor drag speed of 1 m/s was assigned to all fishing methods for unfavourable environmental conditions.

Impulse type 4 – descending fishing gear component collision

This interaction was about gauging how much of an Impulse a descending fishing gear component may produce when it collides with Beach infrastructure and comes to a standstill, for example when a cray pot eventually reaches the seabed and strikes a length of cable located there.

For this assessment every anchor/fishing gear component was assumed to have a similar deceleration period and to reach a terminal velocity prior to impact, with the magnitude of the velocity governed by the anchor's/gear's mass (M_a or M_g), drag coefficient (CD) and projected area (A).

$$\text{Terminal velocity} = [(Ma \times g)/(CD \times 0.5 \times p_w \times A)]^{0.5} \qquad [4]$$

where

g = gravitational constant i.e. 9.81 $m.s^{-2}$

p = mass density of seawater at 1025 $Kg.m^{-3}$

For anchors and ballast the same drag coefficient value of 0.9 was used. The terminal velocity and projected area were then found using the same approach and assigning a representative steel mass for the fishing gear in question. For a craypot, a terminal velocity of 0.95 m/s was used based on experimental data gathered in a flume tank (Wakeford 2000).

The assigned masses to anchors and other gear components can be seen in Table 15 below.

Table 15. Input data and calculation results for the various Impulses and Pulling force against each fishing method.

Fishing method	**RISK SCORE (1 +2 + 3+ 4 + 5) [Ranking]**	**manager**	**vessel length (m)**	**Transit speed max (m/s)**	fishing vessel mass (t)	**IMPACT FOURCE (KN) and RELATIVE SCORE**	Anchor mawss (kg)	Desent sepped (m/s)	**ANCHOR IMPACT FORCE (N) and RELATIVE SCORE**	Drift speed max (M/s)	Anchor stopping period (s)	**ANCHOR DRAG FORCE (N) and RELATIVE SCORE**	Fishing gear speed (m/s)	fishing gear mass (kg)	**F/GEAR IMPACT FORCE (N) AND RELATIVE SCORE**	Fishing gear minimum breaking load (MBL) (KN)	**F/VESSEL MAX PULLING FORCE (KN) and RELATIVE SCORE**
Demersal trawl	5	AFMA	24	5	200	**1000**	220	2.4	**528**	1	3	**73**	2	700	**1400**	283	**283**
	[1]					**1**			**1**			**1**			**1**		**1**
Scallop dredging	2.58	VIC	15	5	125	**625**	58	1.5	**87**	1	3	**19**	1.5	800	**1200**	189	**189**
	[2]					**0.63**			**0.16**			**0.26**			**0.86**		**0.67**
Craypot / giant crab	1.91	VIC	20	5	150	**750**	130	2	**260**	1	3	**43**	0.95	15	**14.25**	20.4	**20**
	[3]					**0.75**			**0.49**			**0.59**			**0.01**		**0.07**
Gillnet	1.82	AFMA	20	5	125	**625**	130	2	**260**	1	3	**43**	1.1	25	**27.5**	24.8	**25**
	[4]					**0.63**			**0.49**			**0.59**			**0.02**		**0.09**
Jigging	1.65	AFMA	18	5	150	**750**	93	1.8	**167**	1	3	**31**				46	**46**
	[5]					**0.75**			**0.32**			**0.42**					**0.16**
Danish Seine	1.63	AFMA	18	5	150	**750**	93	1.8	**167**	1	3	**31**	1.1	25	**27.5**	34	**34**
	[6]					**0.75**			**0.32**			**0.42**			**0.02**		**0.12**
Demersal longline	1.23	VIC/AFMA	15	5	150	**750**	58	1.5	**87**	1	3	**19**	1.1	25	**27.5**	10.8	**11**
	[7]					**0.75**			**0.16**			**0.26**			**0.02**		**0.04**
Handline	0.27	TAS	8	10	12	**123**	9	0.83	**8**	1		**9**	0.04	1	0.4	1.75	**2**
	[8]					**0.13**			**0.02**			**0.12**			<0.01		**<0.01**
Trolling	0.27	TAS	8	10	12	**123**	9	0.83	**8**	1		**9**				1.75	**2**
	[9]					**0.13**			**0.02**			**0.12**					**<0.01**
Hand gathering	0.27	TAS	8	10	12	**123**	9	0.83	**8**	1		**9**					
	[10]					**0.13**			**0.02**			**0.12**					

Table 16 Fishing related input data for each type of impulse.

Impulse category	Interaction			
	Details	**Mass (or weight) (kg)**	**Vel. Change ($m.s^{-1}$)**	**Period (sec)**
Type 1	vessel only collision	vessel mass derived with $W = 0.0602 \times L^{2.5572}$	5 or 10m/s	1
Type 2	vessel anchor drop impact	Anchor mass derived from AMSA Table (refer App. C) and vessel length	Terminal velocity derived using eq. [4]	1
Type 3	vessel anchor drag impact	Anchor mass derived from AMSA Table (refer App. C) and vessel length	1 m/s	1
Type 4	descending fishing gear component collision	Gear anchor/ballast 25kg Lobster pot 15kg	Terminal velocity for anchors derived using eq. [4]. Lobster pot 0.95 m/s	1

Pulling Force and Calculation Methodology

Pulling force to free snagged gear

When fishing gear becomes entangled/snagged on a seabed obstacle, the vessel will at some stage attempt to release it by applying a pulling force (via the connecting ropes between vessel and fishing gear) in an attempt to recover it.

On most occasions a vessel with snagged fishing gear will draw itself closer to the snag on the premise that the additional uplift will pull the gear free. Under certain circumstances (undercut obstacles like large rocks or vehicles) the vessel may opt to circle the snag and try pulling in a different direction. If these measures fail then the vessel will move progressively closer to directly overhead and use a combination of thrust, winch haul force, and vessel buoyancy to apply more of a load. Understandably, this procedure heightens the risk level. However, if the breaking load of the fishing gear and connecting tackle is relatively low, then the gear will normally fail without jeopardising vessel stability to any great extent. Whereas with some trawlers, especially the smaller vessels towing relatively large gear, the risk of capsizing is very real. Under certain circumstances it may be prudent for the vessel to cut the gear free (i.e., cut the wire(s)) to release the vessel, and then return later and use a grapple (similar to an anchor) to recover the gear. Grappling lost fishing gear usually involves towing a modified form of anchor across the seabed to reconnect the vessel to some part of the gear, and then applying a pulling force to drag it free of the snag. The pulling procedure followed is similar to what is adopted when the gear is snagged whilst fishing, with the difference being that the grapple is often pulled in the opposite direction to when the gear became snagged. For these pulling situations, the minimum breaking load (MBL) of the connecting rope between vessel and fishing gear equates to the maximum applied pulling force, and from a worst case scenario perspective, this force may well be applied from directly overhead if pulling initially at shallower angles proves unsuccessful. To reflect this situation, the maximum pulling force for each fishing method was based on the MBL of the connecting rope (synthetic rope or twine) between vessel and gear. In the case of squid jiggers, the gear analysed was the large sea anchor that is deployed from the bow to reduce vessel drift and improve stability. MBL values for typical connecting rope(s) on each type of fishing gear used in the relevant area are presented in Table 17.

Table 17 Maximum pulling force associated with snagged fishing gear based on the MBL of the main connecting rope/cable between vessel and fishing gear. Note: the pulling force represented by the tensile load in the connecting rope/cable may be a combination of winch power, propeller thrust and vessel buoyancy.

Fishing Method	Connecting rope/cable details	Connecting rope M.B.L. t (KN)
Gillnet	16mm PP rope	2.5 (24.8)
Horizontal longline	10mm PP	1.1 (10.8)
Squid jigging	22mm PP rope	4.7 (46.0)
Octopus trap	10mm PP	1.1 (10.8)
Lobster pot	14mm PP rope	2.1 (20.4)
Lobster pot	14mm PP rope	2.1 (20.4)
Trolling	2mm PA twine	0.18 (1.75)
Handline	2mm PA twine	0.18 (1.75)

Impulse Interaction Assumptions and Approximations

To facilitate the Impulse calculation process certain assumptions and approximations were made regarding the interactions involving fishing vessels, fishing gear and anchor systems. These assumptions and approximations are presented below, together with a reference #. Note: some of these assumptions and approximations were presented and discussed in earlier sections.

A#1 Constant velocity assumption – vessel, gear or anchor was travelling at uniform velocity (speed and direction) just prior to the interaction taking place.

A#2 Vessel anchor drag velocity assumption – under severe environmental conditions whereby vessel anchor(s) drag across the seabed, the resultant velocity was 1m/s.

A#3 Maximal change in velocity assumption – whenever vessel/gear had an interaction with beach infrastructure, a maximal change in velocity would transpire i.e., the body would always come to a standstill

A#4 Interaction period assumption – the interaction period was constant for each of the various types of interaction identified.

A#5 Anchor design assumption – every anchor was of the stockless type, and was T-shaped and made from cylindrical bar. The stock to cross-bar ratio was constant (4:1) between anchors, and the diameter of the rod was kept in proportion to the anchor size (i.e., every anchor despite the size was geometrically similar).

A#6 Anchor mass assumption – Using the AMSA table provided in Appendix E the following relationship between anchor mass Ma and vessel length (L) was derived $Ma = 0.0247x\ L^{2.8597}$. Note: this formula was derived from a line of best (LOB) fit for plotted data obtained from the table, and this LOB fit had a correlation coefficient of 0.9994.

A#7 Anchor material assumption – every anchor was made of steel

A#8 Anchor dimensional assumption – based on the design, mass and material assumptions, it was possible to manipulate the anchor size (stock and cross-member lengths, and rod diameter) to acquire a given volume necessary to meet a total anchor mass target.

A#9 Anchor orientation assumption - every anchor descended with the stock vertical so that the projected area was equivalent to the product of the cross-bar's length and diameter.

A#10 Anchor terminal velocity assumption - every anchor reached a terminal velocity prior to impact.

A#11 Anchor drag coefficient assumption - a representative drag coefficient for every anchor descending was 0.9. i.e., based on a stockless anchor (Woo & Na 2014).

A#12 Reynolds number effect on anchor drag coefficient assumption – due to the relatively high Reynolds numbers associated with each anchor descending through the water, it was reasonable to assume the drag coefficient was independent of Reynolds number (Woo & Na 2014).

A#13 Fishing vessel loading condition assumption – all vessels had a similar loading condition based on a departing port condition (i.e., fluid tanks full, hold empty, full array of fishing gear and supplies onboard). Note: this assumption ensured each vessel was at, or very close to, its maximum displacement i.e., mass

A#14 Fishing vessel prismatic coefficient similarity assumption – all vessels were geometrically similar (i.e., shared a similar length to breadth to depth ratio) despite differences in overall length.

A#15 Steel Fishing vessel assumption - all vessels were made from steel, even though in some fisheries wood and composite materials were evident.

A#16 Vessel length to weight relationship assumption - All vessels were made from steel, and because they were "geosims", a vessel weight (W) to length (L) relationship existed; represented by $W = 0.0602 \times L^{2.5572}$ Note: this expression was based on data from nine steel trawlers ranging between 22.5 and 39.9m LOA and with a displacement range of 141 and 670t, respectively.

A#17 Vessel displacement mono hullform assumption – all vessels had displacement mono hullforms, even though in some fisheries multi-hull designs were present.

A#18 Vessel uniform transit speed assumption – all vessels were assumed to have a transit speed of 5 m/s (i.e., c. 10 knots) or 10m/s (trolling, handline, hand gathering), irrespective of size.

A#19 scenario where a vessel tows with a relatively strong tidal current (evident in this

A#19 Uniform vessel length to height ratio assumption – every vessel was geometrically similar and shared a length to height ratio of 5:1.

APPENDIX C – DETERMINANTION OF ANCHOR MASS

Determination of Anchor Mass for Australian Commercial Vessels

3.2 EQUIPMENT NUMBER

Equipment number is a function of displacement, frontal area and profile area
It shall be calculated by the following equation:

$$EN = \{(\Delta^{2/3}.\ f_h) + 2(B.a + \Sigma b.h.\cos\theta_f) + 0.1(A_h + A_{ss}\ .\ \cos\theta_p)\}\ f_o \quad \text{..... (3.1)}$$

where

EN	=	equipment number
Δ	=	vessel displacement, in tonnes
B	=	moulded breadth, in metres
a	=	Freeboard, in metres
b	=	breadth of deckhouse tier if greater than B/4, in metres
h	=	height of deckhouse tier if greater than B/4, in metres
A1 A_h	=	the hull profile above waterline, in square metres
A_{ss}	=	superstructure profile area, in square metres
θ_f	=	slope of superstructure front to the vertical, in degrees
θ_p	=	slope of superstructure side to the vertical, in degrees
f_h	=	factor for hull type:
		1.0 for monohulls
		1.26 for catamarans
		1.33 for trimarans
f_o	=	factor for operational area:
		1.0 for area A, B and C
		0.8 for area D
		0.54 for area E

3.3 HOLDING POWER

The holding power (force) of an anchor is related to the equipment number by the following equation:

$$P_h = 3\ (0.002\ EN^2 + 2.3\ EN + 9) \times 9.81 \quad \text{..... (3.2)}$$

where

P_h	=	holding power (force), in newtons
EN	=	equipment number

3.4 ANCHOR MASS

The required anchor mass is related to the anchor holding power by the following equation:

$$M_a = P_h/(F_t \times 9.81) \quad \text{..... (3.3)}$$

where

M_a	=	required anchor mass, in kilograms
P_h	=	holding power (force), in newtons
F_t	=	factor for anchor type:
		3.00 for standard anchors
		4.29 for high holding power anchors
		5.45 for super high holding power anchors

Regulations concerning anchor shackle strength and permissible anchor cable types

CHAPTER 4 REQUIREMENT FOR COMPONENTS

4.1 ANCHOR SHACKLE

The anchor shackle provides the link between the anchor and the anchor cable. The basic requirements of the anchor shackle are:

The strength of the anchor shackle shall be equal to or more than that of the anchor cable it is connected to.

NOTE: As the shape of the anchor shackle is inherently weaker than stud-link anchor cable this will require a larger diameter for the shackle leg and pin.

The proof load for the anchor shackle shall be greater than the certified holding power of the anchor it is connected to.

4.2 ANCHOR CABLE

4.2.1 Cable type

A1 The anchor cable shall be of stud-link chain, short-link chain, wire rope or fibre rope, subject to the requirements of this Chapter.

4.2.2 Design requirements

The anchor cable shall be designed such that the following applies:

a) It provides a connection between the anchor and the vessel of sufficient length so that the anchor is able to provide maximum holding power.

b) It provides a measure of elasticity to reduce the response loads on the vessel and anchor caused by the variation in the applied loads on the vessel due to wind, wave and current forces.

To satisfy the design requirements, the anchor cable shall have a working strength greater than the holding power of the anchor to be used. The anchor cable shall be able to absorb the design accelerations without exceeding the holding power of the anchor. This may be achieved by the use of mass, the elastic properties of the anchor cable, cable length or some combination of these characteristics.

4.2.3 Steel chain

The diameter of the chain shall be as per Clause 3.5 or Table 4.1.

Chain shall be manufactured, tested and certified in accordance with one of the following:

a) ISO 1704 or equivalent National or International Standard.

b) AS 2321 or equivalent National or International Standard.

c) recognised organisation.

4.2.4 Steel wire rope

It is permitted to replace chain by steel wire rope where the equivalent anchor mass does not exceed that of a 130 kg standard anchor and the breaking load of the steel wire rope is at least equal to that of chain cable. The minimum length of chain at the end of wire rope shall be as per Table 4.1.

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Wire ropes shall be manufactured, tested and certified in accordance with one of the following:

a) AS 3569 or equivalent National or International Standard.

NOTE: For information on the operation and maintenance of steel wire ropes, refer to AS 2759.

b) The requirements of a recognised organisation.

4.2.5 Fibre rope

Fibre rope is allowed for any anchor excepting anchors on vessels operating in A, B and C Class waters where the equivalent anchor mass exceeds that of a 130 kg standard anchor. The minimum breaking load of the fibre rope shall be equal to or more than that of a chain cable. The rope shall be in good condition, free from sunlight damage, abrasions, and hockles. The minimum length of chain at the end of fibre rope shall be as per Table 4.1.

NOTE: For guidance, rope diameters are given in Table 4.1.

The fibre ropes shall be manufactured as per AS 4142.2 or equivalent National or International Standard and tested as per AS 4143.1 or equivalent National or International Standard.

NOTE: For information on care and safe usage of fibre ropes, refer to AS 4142.1.

Fibre ropes that have been certified by a recognised organisation shall be deemed to comply with this National Standard.

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Table 4.1 – Dimensions of anchor cable

Cable material	Standard anchor mass Kg	Short-link chain	Manila	Poly-propelene	Nylon	Poly-ethylene	+ Chain length
		Diameter mm					
Chain, wire rope or fibre rope	Under 8	8	14	12	10	14	3 m chain of table size shackled between rope and anchor
	8 – 13	8	16	12	10	14	
	13 – 18	8	18	14	11	16	
	18 – 25	8	20	16	12	18	
Chain, wire rope or fibre rope	25 – 32	10	24	16	14	20	6 m chain of table size shackled between rope and anchor
	32 – 38	10	24	18	14	22	
	38 – 44	10	24	22	16	24	
	44 – 51	13	30	24	18	28	
	51 – 76	14	34	28	20	32	
	76 – 89	14	38	32	22	36	
	89 – 100	15	40	34	24	36	
	100 – 130	15	48	40	30	44	
Fibre rope permitted for vessels operating in partially smooth water and smooth water	130 – 178	16					9 m chain of table size shackled between rope and anchor
	178 – 226	17					
	226 – 274	19					
	274 – 322	20					
	322 – 370	21					
	370 – 432	21					

4.2.6 Windlass, capstan or winch

Mechanical lifting devices shall be fitted if the combined mass of anchor and one third of the cable exceeds the local Occupational Health and Safety (OHS) requirements for manual lifting. Cable stoppers, claws or similar fastenings shall be provided as necessary between the windlass or capstan and the hawse pipe. The windlass or capstan shall be designed for immediate dropping of the anchor and shall have an efficient brake.

Means shall be provided to secure the cable at the required length. The means shall be of strength sufficient to withstand loads not less than the breaking strength of the cable, including shock loading.

The bitter end of the cable shall be permanently secured to the vessel by an attachment of strength sufficient to withstand loads not less than the breaking strength of the cable.

SETFIA SOUTH EAST TRAWL FISHING INDUSTRY ASSOCIATION sustainable fishing practices protect our future

APPENDIX D – AMSA VESSEL CLASS AND SURVEY CATEGORY

Vessel use	Indicated by
Passenger vessel (13 or more passengers)	1
Non-passenger vessel (up to 12 passengers)	2
Fishing vessel	3
Hire and drive vessel used by the hirer only for recreational purposes	4

Operational area	Indicated by
Unlimited domestic operations (no longer available to domestic commercial vessels). Vessels operating in A waters must be Australian regulated vessels under the *Navigation Act 2012*.	A
Extended offshore operations (beyond 200 nautical miles from the baseline of the Australian mainland, Tasmania, a recognised island but within the exclusive economic zone)	B Extended
Offshore operations (within 200 nautical miles from the baseline of the Australian mainland, Tasmania, a recognised island but within the exclusive economic zone)	B
Restricted offshore operations (within 30 nautical miles from the baseline of the Australian mainland, Tasmania, a recognised island; within 50 nautical miles of the baseline of Queensland, within the Great Barrier Reef Region or the Torres Strait Zone; whilst remaining within the exclusive economic zone)	C
Restricted offshore operations—specified areas	C Restricted
Partially smooth water operations	D
Smooth water operations	E

APPENDIX E – ANCHOR MASS IN KG FOR CLASS A AND B VESSELS

L \ H	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
3														
4			8	11										
5		8	12	13.5	16									
6	8	11	14	16	18.5	21								
7	10	13	16	18.5	21	24	26							
8	12	15	18.5	21	24.5	27	31	35						
9	14	17	21	24	28	32	36	41	46					
10	16	19	23.5	27	32	37	42	47	52	59				
11	18	22	26	31	37	42	48	54	61	67.5	75			
12	20	24.5	29	35	41	48	54	62	69.5	77	87	96		
13	22	27	33	40	46.5	53.5	62	70	80.5	90	99.5	110	121	
14	24	30.5	37.5	45	52	61	70	81	91	102	113	125	138	148
15	27	35	42	50	59	69	79	91	102	115	128	141	154	168
16	31	39	47	56	66	77	90	102	115	129	142	156	171	186
17	35	43	52	63	74	87	100	114	129	143	158	174	190	206
18	39	48	58	70	83	97	111	127	142	158	175	191	210	226
19	43	53	65	78	93	108	124	140	156	175	192	211	228	246
20	48	59	72	87.5	103	120	137	154	173	191	211	229	248	268
21	53	66	80	97	114	132	149	169	189	208	228	248	270	291
22	59	73	90	107	126	145	164	185	206	226	247	270	292	318
23	65	82	100	118	138	158	180	201	223	244	268	291	318	347
24	72	90	109	130	150	172	195	218	240	264	289	318	344	388

Above == 1 anchor required

Below == 2 anchors required

H is height in metres

L is measured length in metres

Figure 56 Anchor mass in Kg for Class A vessels

SETFIA SOUTH EAST TRAWL FISHING INDUSTRY ASSOCIATION
sustainable fishing practices protect our future

L \ H	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
3														
4			7	10										
5		7	10	12	14									
6	7	10	12	13	15	18								
7	9	11	14	16	18	20	22.5							
8	10	12.5	15	17.5	20	22.5	25	30						
9	12	15	17.5	20	22.5	27.5	30	35	40					
10	14	17	20	22.5	27.5	30	35	40	45	50				
11	15	20	22.5	25	30	35	40	45	50	55	60			
12	17	20	25	30	35	40	45	50	57.5	65	72.5	80		
13	20	25	30	35	40	45	50	60	67.5	75	82.5	90	100	
14	20	25	32.5	37.5	45	50	57.5	67.5	75	85	95	105	115	125
15	22.5	30	35	42.5	50	57.5	65	75	85	95	110	120	130	140
16	25	32.5	40	47.5	55	65	75	85	97.5	110	120	130	140	155
17	30	37.5	45	52.5	62.5	72.5	85	95	110	120	130	145	160	175
18	32.5	40	50	60	70	80	92.5	105	120	130	145	160	175	190
19	35	45	55	65	77.5	90	105	120	130	145	160	175	190	205
20	40	50	60	72.5	85	100	115	130	145	160	175	190	205	225
21	45	55	67.5	80	95	110	125	140	160	175	190	210	225	245
22	50	60	75	90	105	120	135	155	175	190	205	225	245	265
23	55	70	85	100	115	130	150	170	190	205	225	245	265	290
24	60	75	90	110	125	145	165	180	200	220	240	260	285	320

Above == 1 anchor required

Below == 2 anchors required

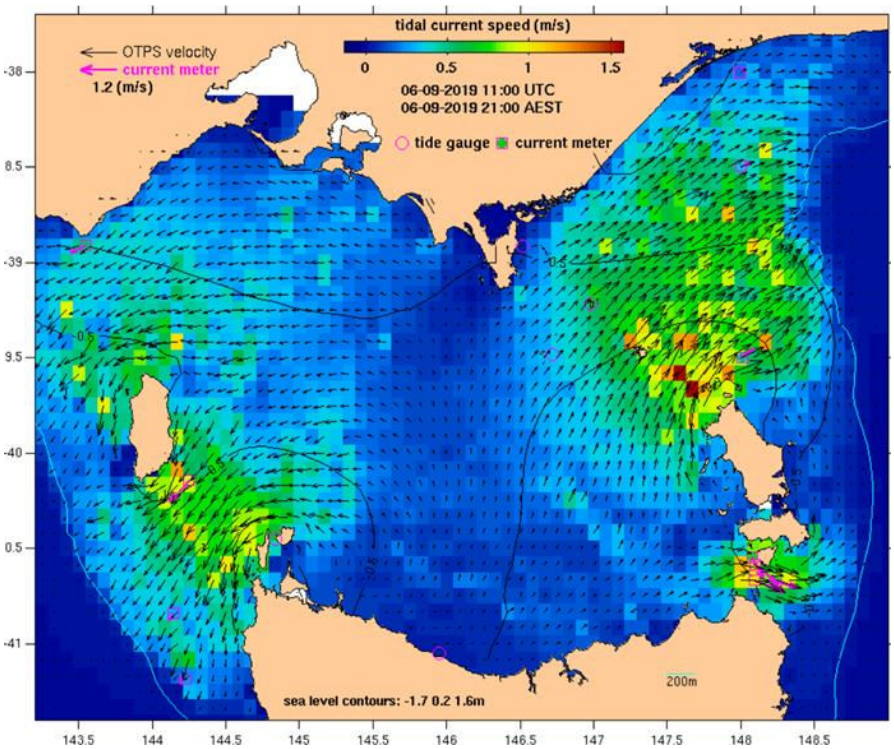
H is height in metres

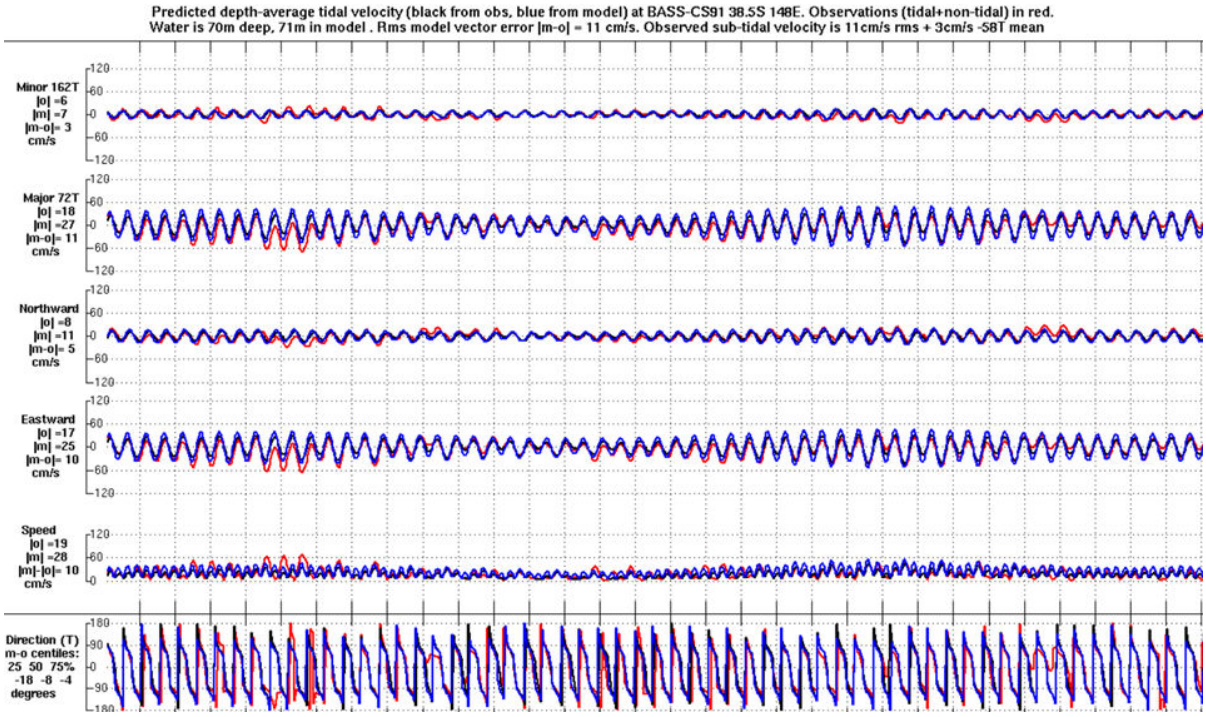
L is measured length in metres

Figure 57 Anchor mass in Kg for Class B vessels

APPENDIX F – TIDAL CURRENT DATA

Taken from CSIRO current meters coupled with computational modelling.





Appendix C Stakeholder Consultation Information

Offshore Gas Victoria Project

Program Summary

Information Sheet | October 2023

Project overview

Beach Energy (Beach) supplies the ongoing natural gas needs of Victorian homes, business and industry, through production at the Otway Gas Plant near Port Campbell and the Lang Lang Gas Plant, 80kms south-east of Melbourne CBD.

Beach successfully drilled one exploration well and six production wells in the Otway Basin offshore Commonwealth permits over the past four years. Four production wells have been connected and are now producing gas for the east coast market, with two remaining wells still to be connected.

Beach is continuing its commitment to supply natural gas to the east coast domestic market and has commenced planning for the Offshore Gas Victoria (OGV) Project to deliver the next phases of exploration and development.

The OGV Project is planning activities across several phases and remains subject to a final investment decision. As planning progresses, project timings and final scope will be confirmed and updated in our communications.

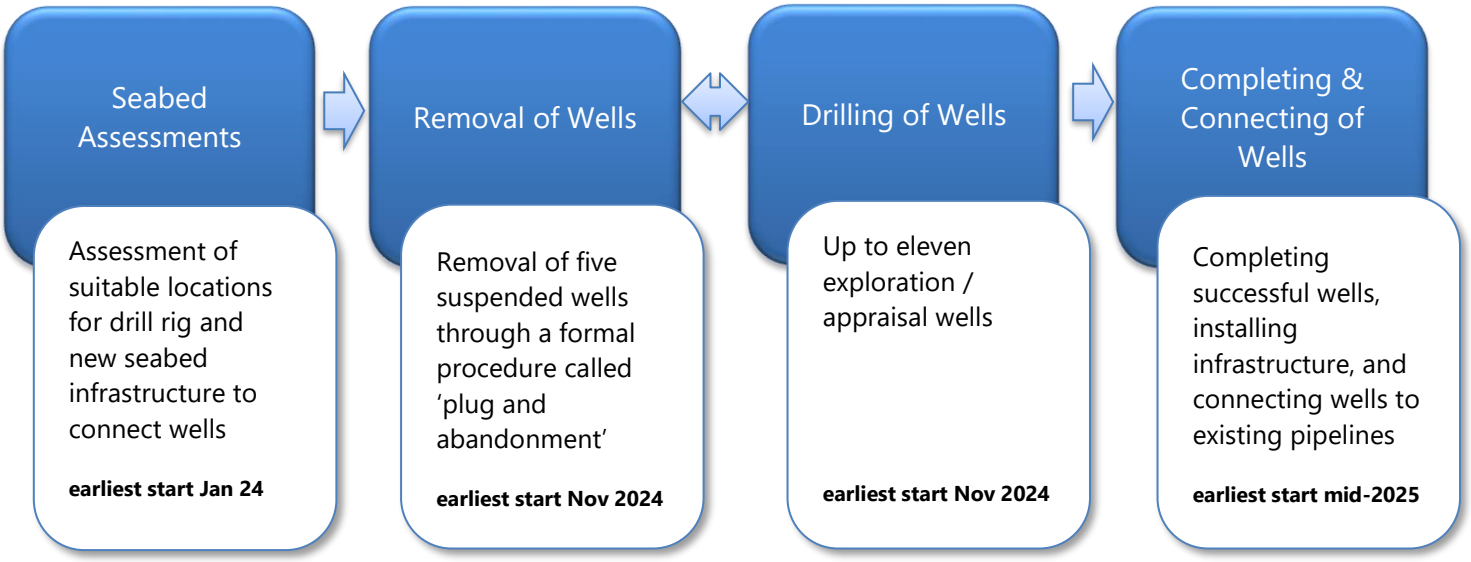
The OGV Project is considering a range of activity across several phases (summarised below).

Environment protection regulations

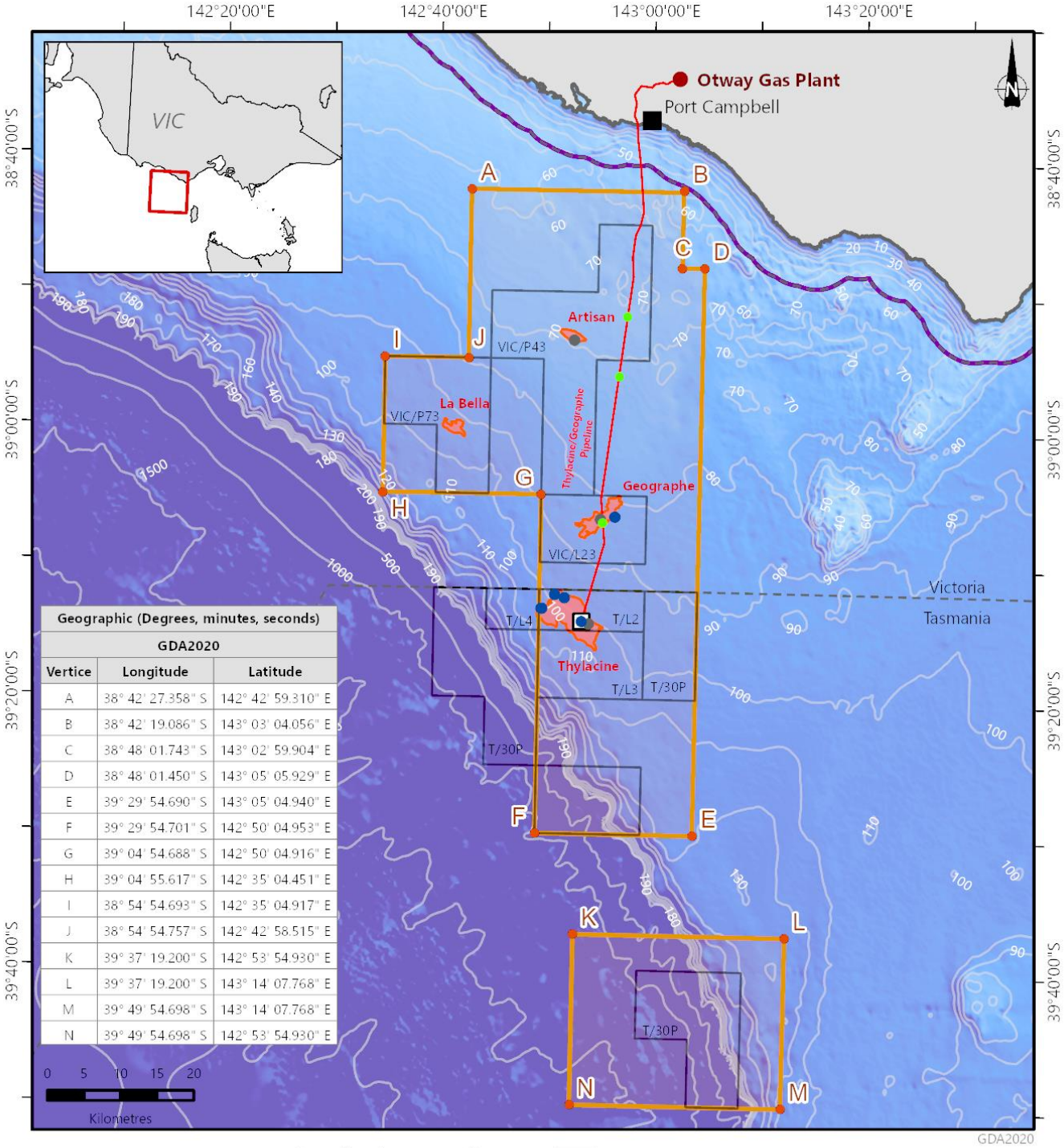
The National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA), regulates activities in accordance with the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations (2009)* (Environment Regulations). The OGV Project will require Environment Plans to be accepted by NOPSEMA before commencement of activities.

Environment Plans must include a description of the existing environment and the proposed activities, an evaluation of the impacts and risks, environmental performance outcomes and controls, implementation strategy, and reporting requirements. They must also demonstrate that consultations with persons or organisations whose functions, interests and activities may be affected by the activities in the Environment Plan ("*relevant persons*"), have been carried out in accordance with the regulations.

For successful gas discoveries that will proceed to development, an Offshore Project Proposal (OPP) will be required and will undergo a public consultation phase. Once an OPP is accepted, further Environment Plans will be required for construction activities and commissioning the new wells.



Otway Basin



Geographic (Degrees, minutes, seconds)		
GDA2020		
Vertice	Longitude	Latitude
A	38° 42' 27.358" S	142° 42' 59.310" E
B	38° 42' 19.086" S	143° 03' 04.056" E
C	38° 48' 01.743" S	143° 02' 59.904" E
D	38° 48' 01.450" S	143° 05' 05.929" E
E	39° 29' 54.690" S	143° 05' 04.940" E
F	39° 29' 54.701" S	142° 50' 04.953" E
G	39° 04' 54.688" S	142° 50' 04.916" E
H	39° 04' 55.617" S	142° 35' 04.451" E
I	38° 54' 54.693" S	142° 35' 04.917" E
J	38° 54' 54.757" S	142° 42' 58.515" E
K	39° 37' 19.200" S	142° 53' 54.930" E
L	39° 37' 19.200" S	143° 14' 07.768" E
M	39° 49' 54.698" S	143° 14' 07.768" E
N	39° 49' 54.698" S	142° 53' 54.930" E

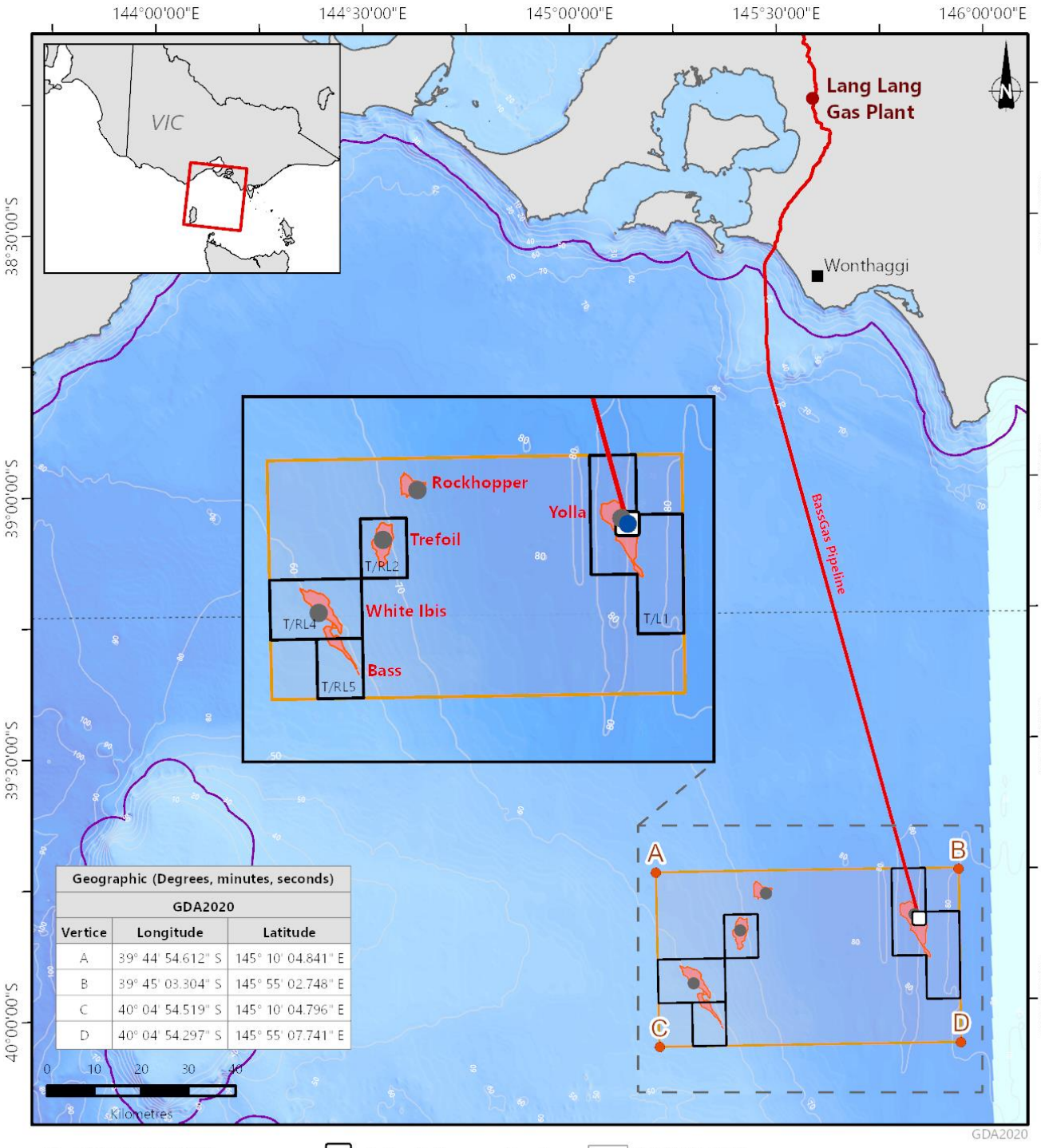
- Production wells
- Suspended wells
- Hot tap tees
- Operational areas vertices
- Thylacine platform and wells
- Existing gas pipeline
- Beach permits
- Seabed assessment area
- Coastal waters (3nm limit)
- Gas fields

25/05/2023

The locations on this map are accurate at the time of publication and are subject to change

OT23-0015C

Bass Basin



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GDA2020		
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- Suspended wells
- Production wells
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- Gas fields
- Beach permits
- Seabed assessment area
- Coastal waters (3nm limit)

25/05/2023 *The locations on this map are accurate at the time of publication and are subject to change* OT23-0015D

Consultation and Feedback

Consultation and feedback is an important part of developing Environmental Plans and Offshore Project Proposals.

This information sheet has been prepared to provide a summary of proposed activities and commence consultation with relevant persons whose functions, interests or activities may be affected by the activities to be carried out under the Environment Plan.

Please contact us if you would like further information or to consult with us about how this project may impact your functions, interests or activities.

Beach will consider all feedback, including any concerns or objections and will explore measures to reduce any impacts and risks.

Relevant persons may request that the information they provide not be published, and it will be identified as sensitive information and not published in the Environment Plan.

If there is someone you believe may be affected by the proposed activities, please have them contact us.

P: 1800 797011

E: community@beachenergy.com.au

beachenergy.com

beach

OGV Drilling Information Sheet

Offshore Gas Victoria Project

Drilling Activities

Drilling activities | July 2023

Project overview

Beach Energy supplies the ongoing natural gas needs of Victorian homes, business and industry, through production at the Otway Gas Plant near Port Campbell and the Lang Lang Gas Plant, 80kms south-east of Melbourne CBD.

Beach is continuing its commitment to supply natural gas to the east coast domestic market and has commenced planning for the *Offshore Gas Victoria* (OGV) Project to deliver the next phases of exploration and development in the Otway and Bass projects.

The OGV Project is considering a range of activity across several phases. Confirmation of project timings and scope is subject to internal and external project approvals, confirmation of contractor vessels and rig availability

This information sheet focuses on drilling activities.

Seabed Assessments

Assessment of suitable locations for drill rig and new seabed infrastructure to connect wells

earliest start Jan 24

Removal of Wells

Removal of five suspended wells through a formal procedure called 'plug and abandonment'

earliest start Jan 2025

Drilling of Wells

Up to eleven exploration / appraisal wells

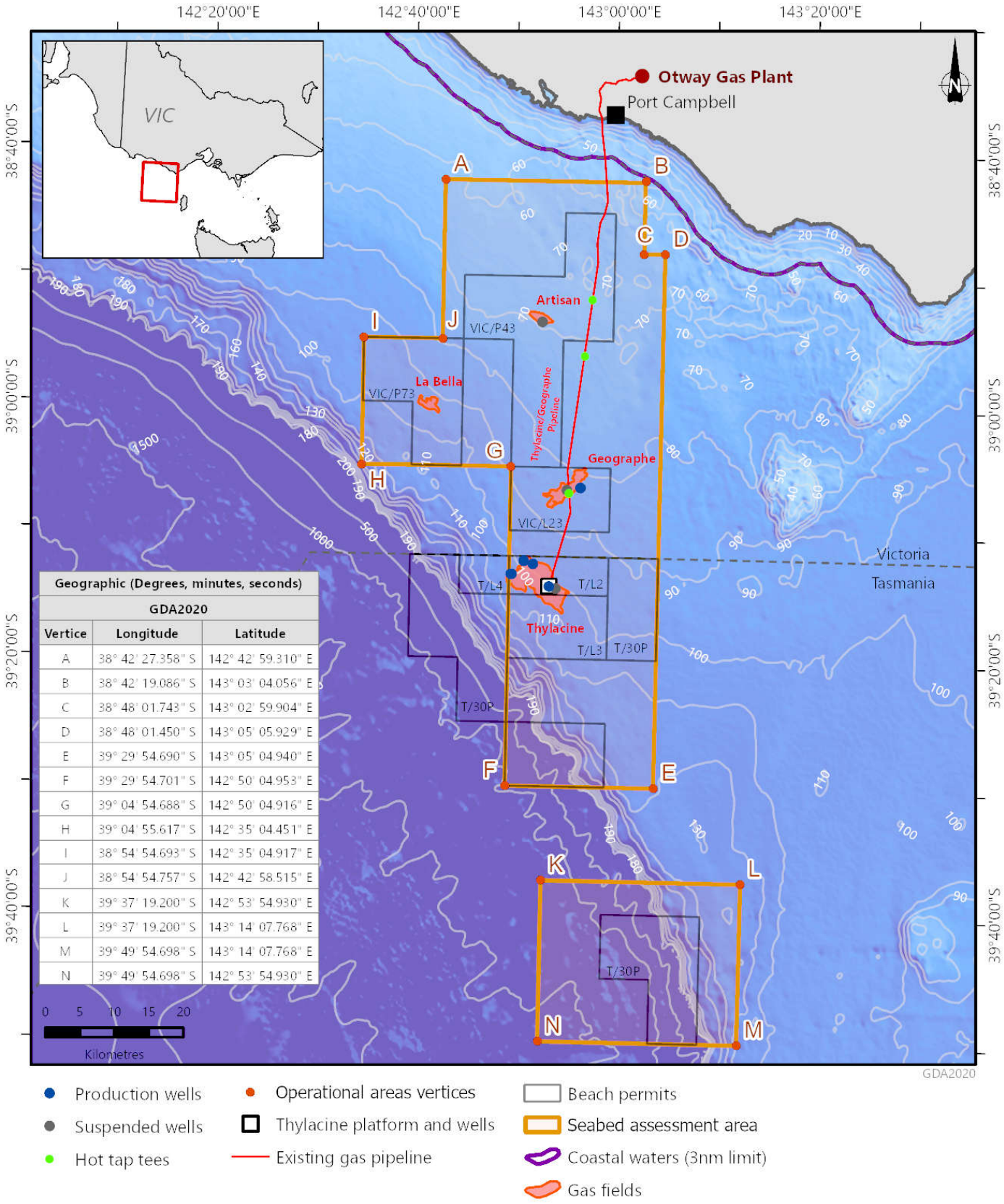
earliest start Feb 2025

Completing & Connecting of Wells

Completing successful wells, installing infrastructure, and connecting wells to existing pipelines

earliest start mid-2025

Otway Basin



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25/05/2023

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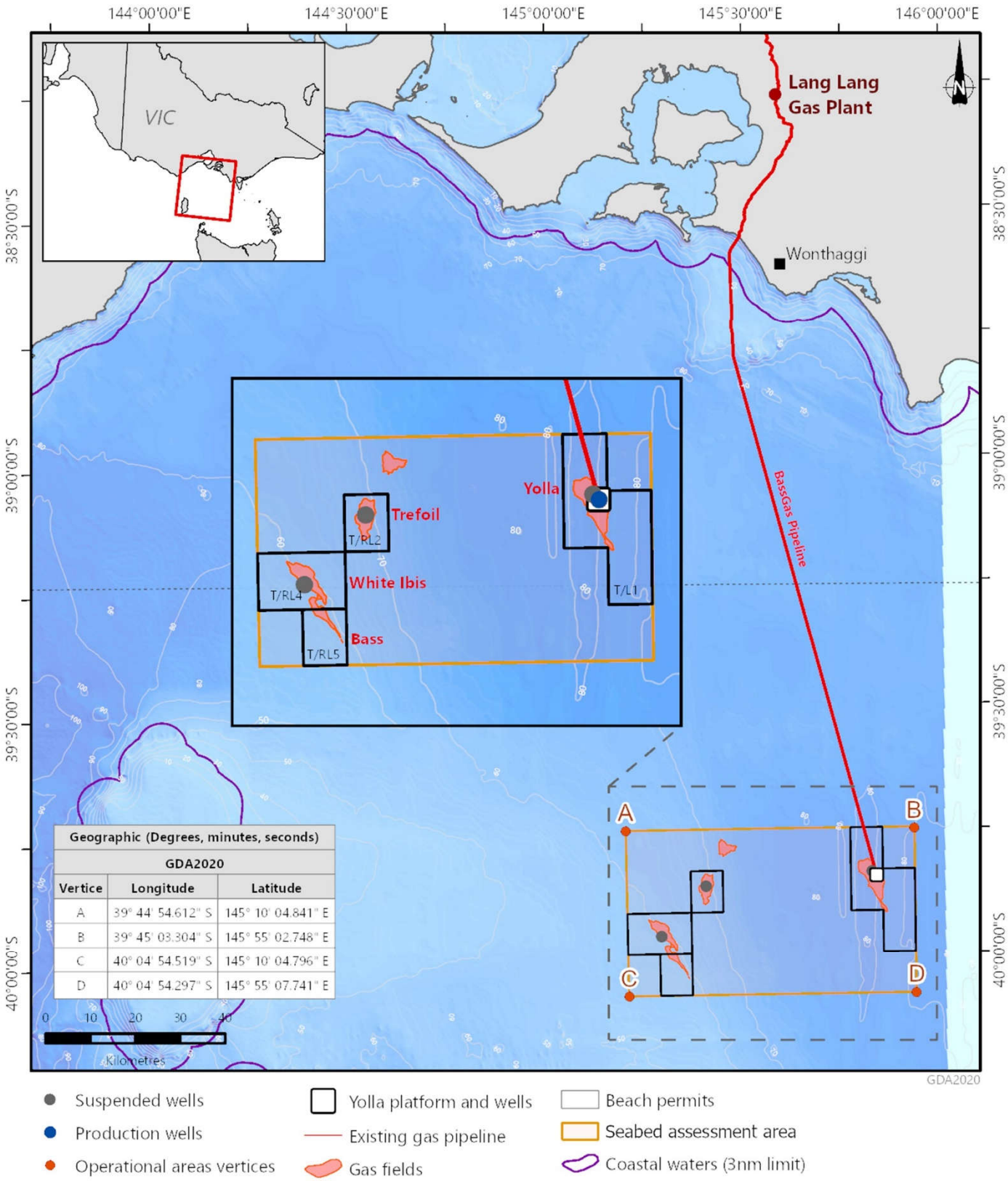
OT23-0015C

Bass Basin



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31/05/2023 *The locations on this map are accurate at the time of publication and are subject to change* OT23-0015D

Offshore Drilling

The OGV Project is a continuation of Beach's previous Phase 4 and 5 projects and may contain up to 11 wells to be drilled over approximately two years. Beach's program of work has been optimised in well design and equipment so that exploration wells can be completed where successful or 'plugged and abandoned (P&A) where unsuccessful.

Part of the drilling program is the re-entry and completion of the Artisan exploration which was drilled in March 2021.

The drilling program is subject to regulatory approval and rig availability and is not expected to commence until at least mid-2024.

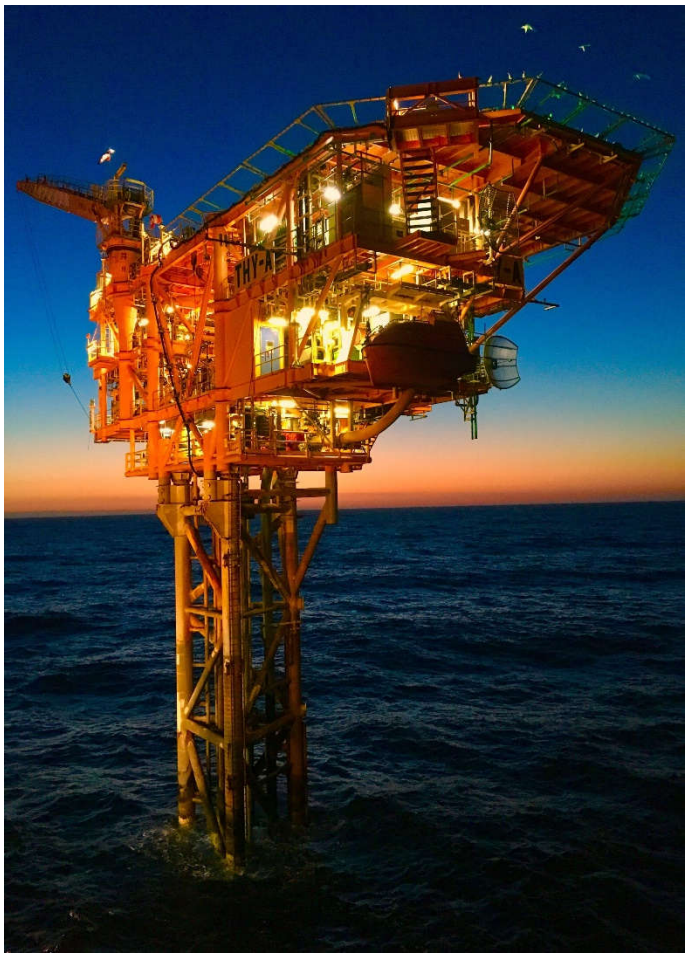
Three different types of wells are proposed as part of the drilling program:

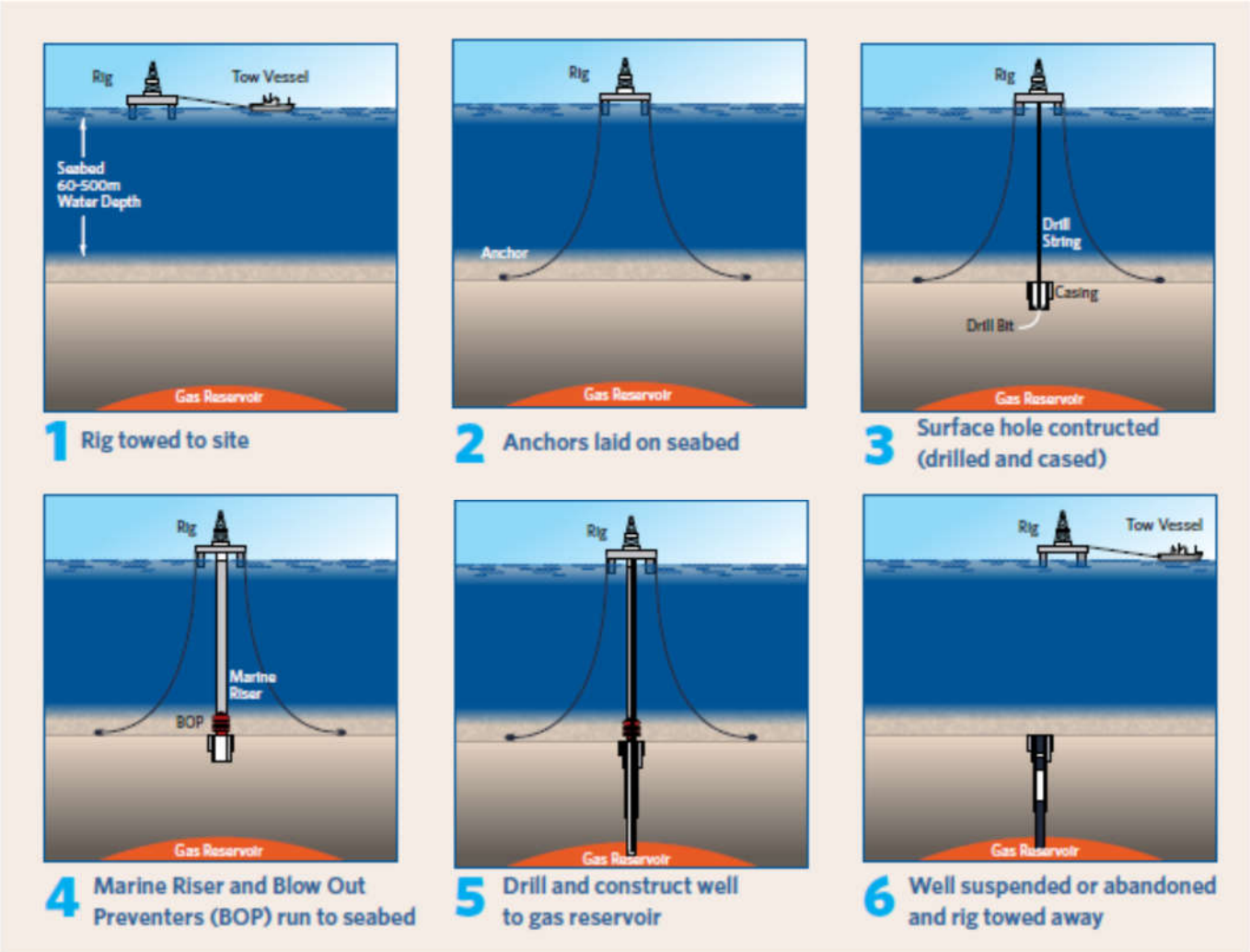
- An **exploration well** is a well drilled to establish the existence of a possible hydrocarbon accumulation in an unproven area. Location of exploration wells typically driven by results of previous seismic surveys that show geological features that strongly indicate the potential for hydrocarbons. Prior to drilling there is a large degree of uncertainty as to whether commercial quantities of hydrocarbon exist.
- **Appraisal wells** are typically drilled once a hydrocarbon accumulation has been discovered by an exploration well. The purpose of appraisal wells is to establish the extent and size of the hydrocarbon accumulation as well as the characteristics of the reservoir. The design, planning and construction of appraisal wells are usually identical to exploration wells.
- A **production well** that has successfully reached a proven reserve and will be tied into seabed infrastructure to supply raw gas for processing.

Approach and equipment

Beach will contract a semi-submersible drill rig for the OGV project.
The approach to drilling is summarised in the following steps.

- Using an approved shipping route, tow vessels will manoeuvre the drilling rig into place
- Anchors will be pre-laid by specialist anchor handling vessels and the rig will be anchored at sites determined as suitable by the seabed assessments
- A surface hole will be drilled and cased, then a marine riser and Blow-out Preventer (BOP) installed
- The well will be drilled to reach the gas reservoir beneath the seabed
- The rig will be moved from one well to the next, repeating the anchoring and drilling process
- After all wells are completed, the drilling rig will be towed to an agreed demobilisation point
- Production wells will be completed with a wellhead remaining above the seabed ready for connection to the existing pipeline
- Exploration wells may be completed, suspended for future completion, or formally abandoned (dry hole).





An outline of the drilling process that will be used in the offshore Otway Basin drilling program

Drilling Methodology

Beach will use a typical semi-submersible drilling rig commonly used in Australian waters. It can operate in waters up to 3,000m deep, drill for gas at up to 10,000m deep and accommodate around 150 crew.

Once the drilling rig is in position and anchored at the well site, a surface hole will be drilled and cased, followed by installation of a marine riser and BOP. Weighing approximately 244 tonnes and measuring 14 m high, the BOP is a highly specialised valve unit used in all offshore drilling. The BOP is used to shut-in and seal off a well for planned operations such as pressure testing and in the event of a pressure build up or 'kick'. It ensures well integrity throughout the drilling process, ongoing safety of personnel and prevention of any environmental incidents.

The drilling process will typically have 4-5 stages, starting with a 42-inch drill head. Drilling will then reduce in diameter to consecutively smaller sizes until it reaches the end target depth. For each section, a casing (steel pipe) will be placed in the hole and cemented, then a smaller drill will be run through the casing to drill a smaller hole to the next target depth and the process repeated to reach the final target.

Drilling muds

Offshore drilling operations typically use both water based, and synthetic based fluids called 'muds' to lubricate and stabilise the wellbores in each section and remove drilling cuttings. Drill cuttings are rock chips from the sedimentary layers that emerge from the drilling process and will range from very fine to coarse in size.

Water based mud will be used in the upper and lower parts of the well to remove the cuttings. Water based muds are recycled as much as possible during the drilling process. Cuttings will not require any treatment and will be deposited onto the seabed.

Synthetic based muds are not planned to be used. Typically, synthetic based muds will require treatment to recover the fluid from the cuttings. The cuttings will be processed on the drilling rig before they are discharged overboard, where they will settle rapidly on the seafloor around the well site. The cuttings will contain small

levels of base fluid, which will quickly biodegrade. This is standard industry practice in Australia.

Marine mammals and fish may transit through these areas but will usually avoid the temporary disturbance. Any exposure to suspended sediment before it settles on the seabed will be highly localised and temporary due to high dilution and fast dispersal in the water column.

Production well connections

When the production wells have been completed, they will be ready to connect to seabed infrastructure and the existing offshore to onshore pipeline.

Some seabed infrastructure for tying in the new wells is already in place and connected to the existing pipelines. Additional infrastructure for any new production wells will also be installed to tie-in to the existing pipeline. New infrastructure will include:

- An Artisan Diving Integration Skid (ADIS) will be installed and connected to the Hot Tap Tee X location on the Otway Gas Production Pipeline at KP33.9
- The A-SVS (Artisan Subsea Valve Skid) will be installed next to and connected to the ADIS
- Flowlines and umbilicals will connect the production wells to the existing A-SVS
- The umbilicals and flying leads will enable remote monitoring and control of the production wells from the Otway Gas Plant via the Thylacine Platform.
- Concrete mattresses will be installed over the flowlines and/or umbilicals for stabilisation and protection as required

A subsea construction support vessel equipped with 2 work-class WROV will install the subsea equipment and pre-commission the production wells after connection. Only the ADIS will be installed using divers from a dive support vessel.

Exploration well completions

Successful exploration wells will either be suspended for future completions, by placing a standard wellhead of around one to two metres in height from the seabed or completed. Positions of wellheads will be notified to the AHO and recorded on nautical charts.

If a well is commercially unviable due to limited gas prospectivity, multiple cement plugs will be installed within the well to permanently seal the well and isolate it from formations. A cement plug will be installed at the seabed and all casings will be cut at least 2 m below the mudline to ensure that the seabed is returned to the same condition prior to drilling (P&A).

Questions and Answers

How long will drilling take?

Each exploration well will take between 35 to 55 days and each production well, between 70 to 90 days. Each P&A well will take approximately 15 days. The entire drilling program can take up to 24 months. Drilling will commence no earlier than mid-2024 and will continue to approximately the end of 2026. Timings will depend on final project planning, regulatory approvals, and fair sea states.

How is the drilling rig secured?

Once the drilling rig has been towed to the well site, supported by an 'anchor handling vessel', the tugboats will run out eight to twelve anchoring lines which may extend to a kilometre and a half. Specifically designed marine anchors, around 15 – 20 tonnes each, will be used to moor the drilling rig. Positioning of the anchors will be determined by a mooring analysis, based on the results of the seabed site assessment and year-round weather data for the area.

Will the drilling rig be visible from land?

The drilling rig at the Artisan well location (Beach previous Phase 4 project) was visible from some shore locations. However, given the distance from the shore of the OGV wells from Artisan and the shore, the drilling rig and support vessels will have low visibility from onshore and may appear similar to other shipping activity.

How many people will work on the drilling rig?

There will be around 150 personnel onboard the drilling rig at any one time. The crew will be transported to and from the rig via helicopter.

How is safety managed on the drilling rig?

At Beach, safety is our first priority. Offshore drilling activities are highly regulated to stringent safety standards. All drilling rig operations will be managed in accordance with the dedicated Safety Case for the drilling rig, to be accepted by the regulator NOPSEMA. For more information see: https://www.nopsema.gov.au/safety/safety-case/

How will Beach manage maritime safety?

The support vessels involved in the activities will operate in accordance with Australian maritime standards and ensure safe operations by:

- Having operational and navigation lighting on all vessels
- Maintaining a 24-hour shipping radar watch
- Monitoring and managing safety and exclusion zones

What will happen to any discharges from the borehole drilling?

Seawater and/or bentonite will be used to lubricate the drill bit and stabilise the borehole, as well as remove seabed material produced through drilling, called cuttings. As the fluids and cuttings come out of the borehole they will be deposited onto the seabed. Bentonite is an inert material that is classed as posing little or no risk to the environment.

Will an exclusion zone exist?

The work will occur among commercial shipping routes and designated Commonwealth and State fisheries. There will be a 2-3 km radius cautionary zone around the drilling rig for avoidance of mooring chains and anchors. There will also be a temporary PSZ in place, which is a safety exclusion zone of 500 m around the drilling rig for each well (new wells or P&A well) location while the rig on location. Formal safety exclusion zones will be communicated via a 'Notice to Mariners' by the AHO. The PSZs will be monitored by support vessels once the drilling rig is anchored into position.

PSZs of approximately 13.5 km^2 already exist for the Thylacine and Yolla platforms, existing wells and infrastructure. New PSZs not exceeding 500m radius will be created for new production well locations and the ADIS structure next to the Otway Gas Production Pipeline.

What about impacts on commercial fishing?

The Project is located within existing designated Commonwealth and State fisheries. Each fishery covers a vast area, whereas the drilling and installation activities require access to relatively small areas. Beach will complete seabed assessments before any drilling activities can commence. Beach will engage closely with the commercial fishing industry to identify any commercial fishers that may operate in the area and to assess any potential impacts. Beach will provide regular updates on its operations to fishing associations throughout the duration of the activities.

Beach has a *Fair Ocean Access* procedure which sets out Beach's commitment to consultation, minimising impacts of its activities, the circumstances in which a fisher may claim compensation, the evidence required and the claim process.

Will the activities affect whales and dolphins?

Vessels within the permit area will move slowly. Each vessel will have a trained marine mammal observer whose specific task is to notify the vessel master of any whale or dolphin and advise them of suitable protocols to avoid potential impact. Avoidance of whales and dolphins will be undertaken in accordance with the Environment Protection and Biodiversity Conservation (EPBC) Regulations (2000), including adherence to required speed and distances. All whale sightings will be recorded along with the actions taken to avoid potential impacts.

Will the drilling impact shipwrecks?

The drilling program will not impact any known shipwrecks. Prior to any drilling commencing, the completed seabed assessments ensure a detailed understanding of the marine environment of each well site. Any new information discovered from these assessments, such as the presence of shipwrecks, will be reported to relevant authorities.

What is ALARP?

ALARP stands for "As Low As Reasonably Practicable". It is an assessment principle commonly used in the oil and gas industry to assess and reduce potential impacts and risks that cannot be completely eliminated. For information on how NOPSEMA assesses ALARP see: ALARP Guidance Note (nopsema.gov.au)

Consultation and Feedback

Consultation and feedback is an important part of developing Environmental Plans and Offshore Project Proposals.

This information sheet has been prepared to provide a summary of proposed activities and commence consultation with relevant persons whose functions, interests or activities may be affected by the activities to be carried out under the environment plan.

Please contact us if you would like further information or to consult with us about how this project may impact your functions, interests or activities.each will consider all feedback, including any concerns or objections and will explore measures to reduce any impacts and risks.

Relevant persons may request that the information they provide not be published, and it will be identified as sensitive information and not published in the EP.

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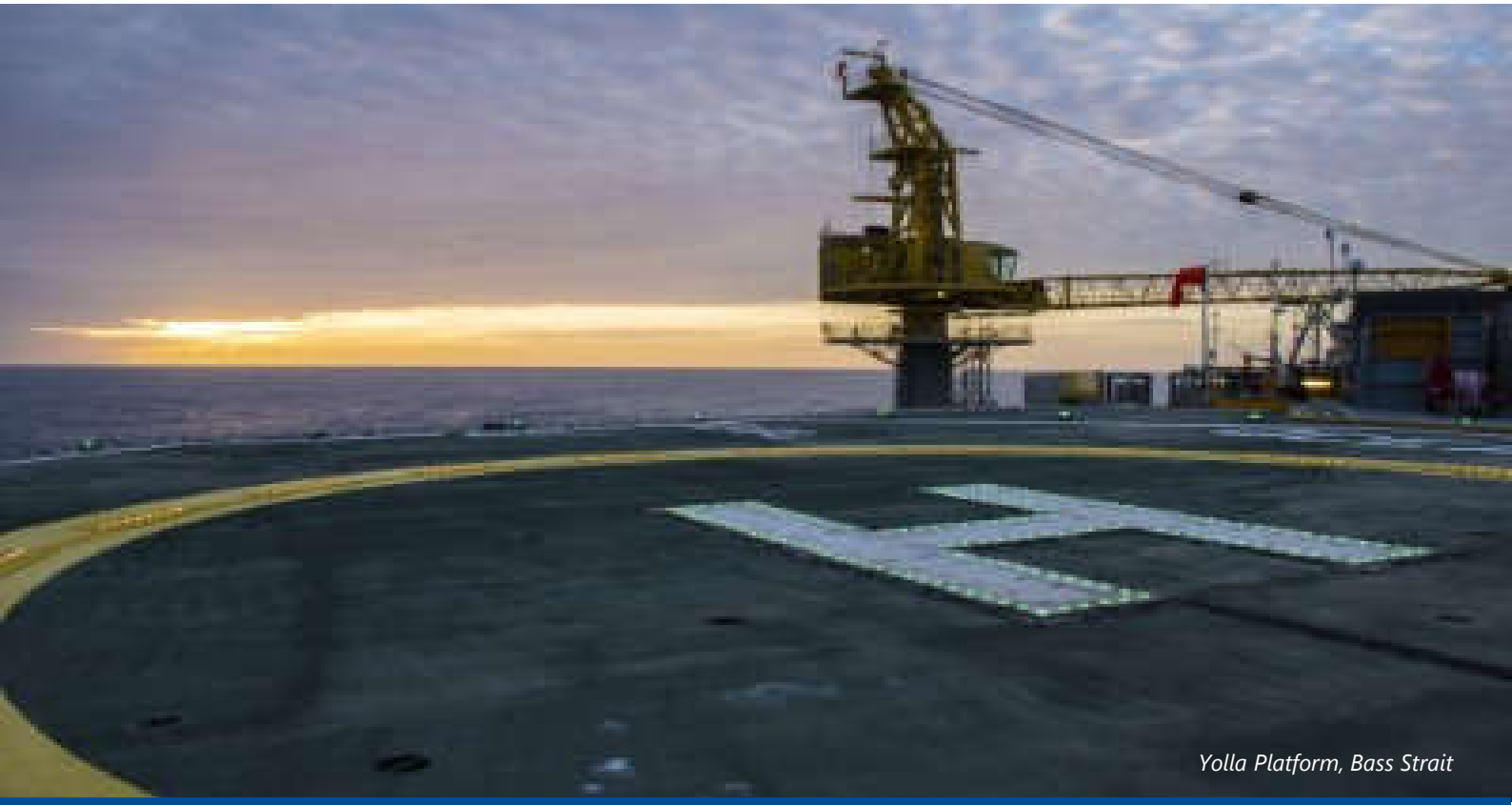
OGV P&A Information Sheet

Offshore Gas Victoria Project

Plug and Abandonment Activities



Yolla Platform, Bass Strait

Plug and Abandonment activities | July 2023

Project overview

Beach Energy supplies the ongoing natural gas needs of Victorian homes, business and industry, through production at the Otway Gas Plant near Port Campbell and the Lang Lang Gas Plant, 80kms south-east of Melbourne CBD.

Beach is continuing its commitment to supply natural gas to the east coast domestic market and has commenced planning for the *Offshore Gas Victoria* (OGV) Project to deliver the next phases of exploration and development in the Otway and Bass projects.

As part of the OGV Project Beach is planning for the 'plug and abandonment' (P&A) five suspended wells. Confirmation of project timings and scope is subject to internal and external project approvals, confirmation of contractor vessels and rig availability

This information sheet focuses on the P&A activities.

Seabed Assessments

Assessment of suitable locations for drill rig and new seabed infrastructure to connect wells

earliest start Jan 24

Removal of Wells

Removal of five suspended wells through a formal procedure called 'plug and abandonment'

earliest start Jan 2025

Drilling of Wells

Up to eleven exploration / appraisal wells

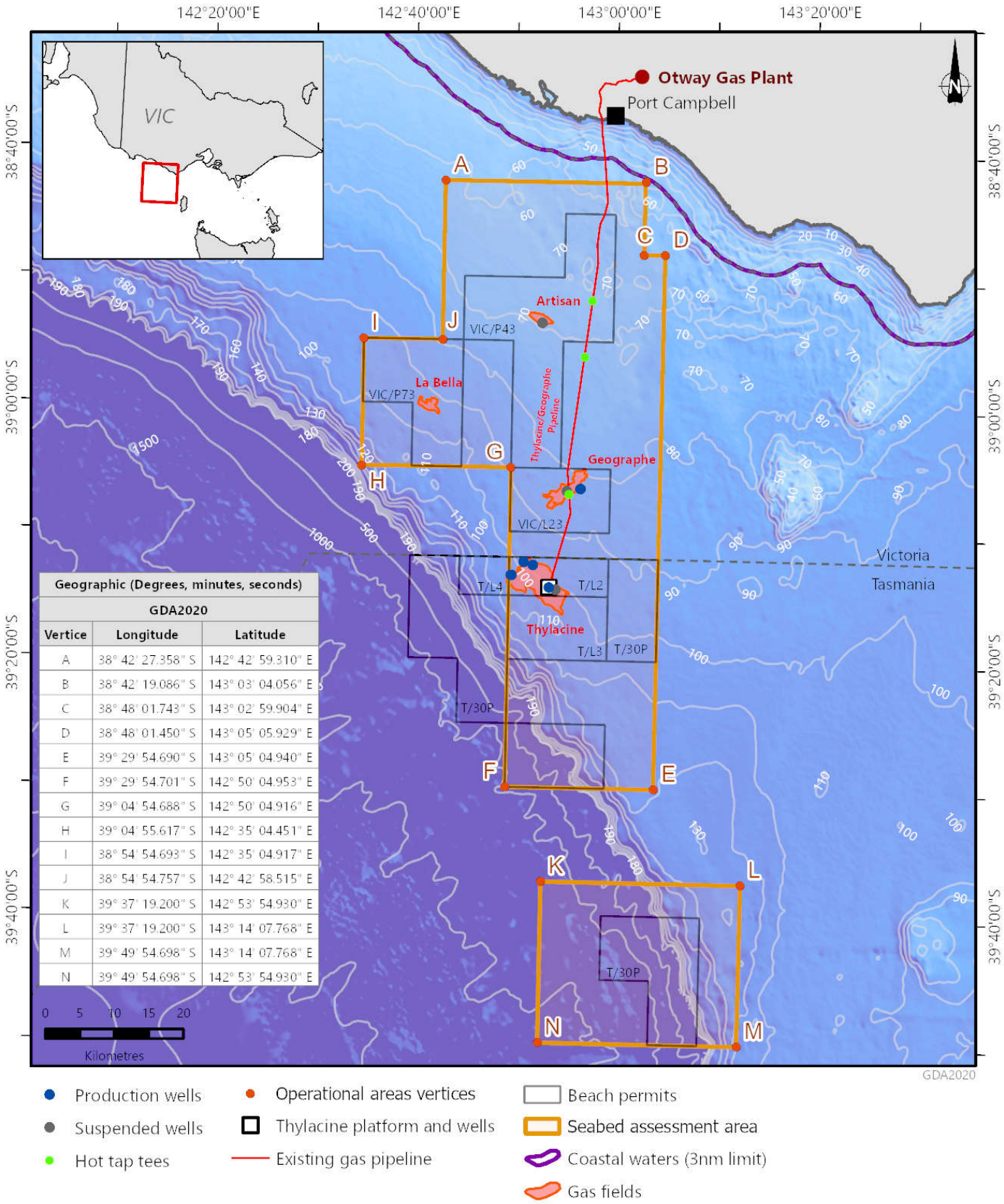
earliest start Feb 2025

Completing & Connecting of Wells

Completing successful wells, installing infrastructure, and connecting wells to existing pipelines

earliest start mid-2025

Otway Basin



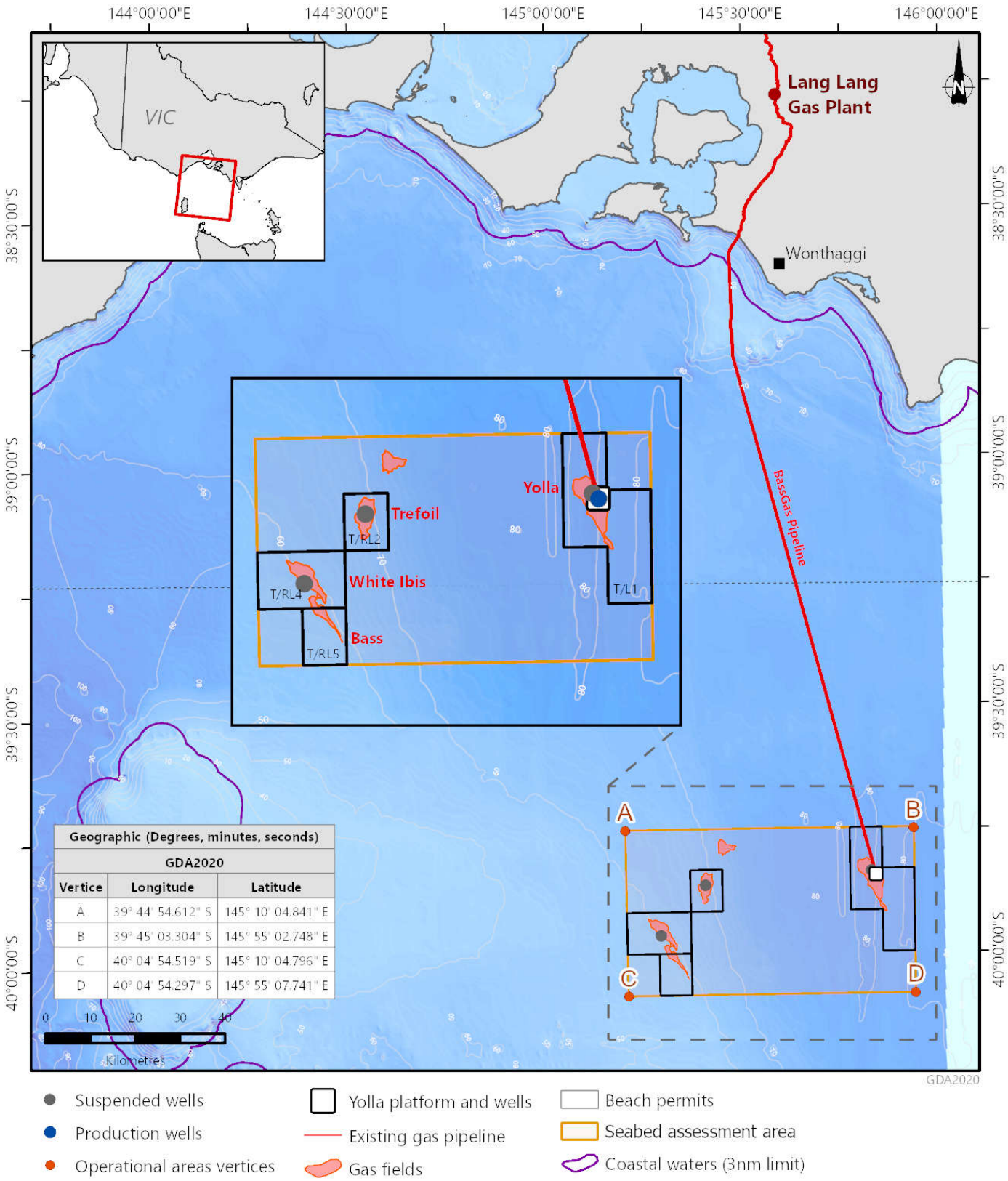
Geographic (Degrees, minutes, seconds)		
GDA2020		
Vertice	Longitude	Latitude
A	38° 42' 27.358" S	142° 42' 59.310" E
B	38° 42' 19.086" S	143° 03' 04.056" E
C	38° 48' 01.743" S	143° 02' 59.904" E
D	38° 48' 01.450" S	143° 05' 05.929" E
E	39° 29' 54.690" S	143° 05' 04.940" E
F	39° 29' 54.701" S	142° 50' 04.953" E
G	39° 04' 54.688" S	142° 50' 04.916" E
H	39° 04' 55.617" S	142° 35' 04.451" E
I	38° 54' 54.693" S	142° 35' 04.917" E
J	38° 54' 54.757" S	142° 42' 58.515" E
K	39° 37' 19.200" S	142° 53' 54.930" E
L	39° 37' 19.200" S	143° 14' 07.768" E
M	39° 49' 54.698" S	143° 14' 07.768" E
N	39° 49' 54.698" S	142° 53' 54.930" E

25/05/2023

The locations on this map are accurate at the time of publication and are subject to change

OT23-0015C

Bass Basin



Geographic (Degrees, minutes, seconds)		
GDA2020		
Vertice	Longitude	Latitude
A	39° 44' 54.612" S	145° 10' 04.841" E
B	39° 45' 03.304" S	145° 55' 02.748" E
C	40° 04' 54.519" S	145° 10' 04.796" E
D	40° 04' 54.297" S	145° 55' 07.741" E

31/05/2023

The locations on this map are accurate at the time of publication and are subject to change

OT23-0015D

Plug and abandonment

The OGV Project is a continuation of Beach's previous Phase 4 and 5 projects and may contain up to 11 wells to be drilled over approximately two years. Beach's program of work has been optimised to allow for the permanent P&A of five suspended wells. These wells are isolated from hydrocarbon zones and are managed in accordance with a Wells Operation Management Plan to ensure well integrity.

Suspended exploration wells are P&A when they are not suitable as future production wells due to limited gas prospectivity. Cement plugs will be installed within the well to permanently seal the well and isolate it from formations. A cement plug will be installed at or close to the seabed and all casings will be cut at least 2 m below the mudline to ensure that the seabed is returned to the same condition prior to drilling (P&A). Debris in vicinity will also be surveyed and retrieved where feasible to do so.

The P&A of wells is often planned to coincide with the drilling of new exploration or production wells using the same drilling rig which is the case with the OGV Project.

Questions and Answers

When were the wells drilled?

The wells were drilled by previous lease titleholders, from 1985 through to the most recent well being drilled by Origin Energy in 2004. Beach and its joint venture partners acquired the retention leases and production licence, the wells and associated production assets from Origin Energy in 2018.

Why are you decommissioning the suspended wells?

Although Beach is continuing development of natural gas in the Otway and Bass Basins, the suspended exploration wells are not suitable as future production wells. In addition, new exploration wells will be P&A shortly after drilling should results show limited prospectivity.

Are the suspended wells monitored for leaks?

Cement plugs were installed to suspend and seal the wells. Since then, the wells have undergone routine monitoring and have met inspection criteria.

Although unlikely given the well construction method, if a leak was found during an inspection, the hydrocarbon volume and composition would be assessed in order to determine the required maintenance response or 'plug and abandonment' action.

No leaks have been observed from all suspended wells inspections to date.

Consultation and Feedback

Consultation and feedback is an important part of developing Environmental Plans and Offshore Project Proposals.

This information sheet has been prepared to provide a summary of proposed activities and commence consultation with relevant persons whose functions, interests or activities may be affected by the activities to be carried out under the environment plan.

Please contact us if you would like further information or to consult with us about how this project may impact your functions, interests or activities.

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OGV Drilling Information Sheet Updated

Offshore Gas Victoria Project

Drilling activities

Thylacine Platform with drill rig in background

Drilling activities | November 2023

Project overview

Beach Energy (Beach) supplies natural gas for the ongoing needs of Victorian homes, business and industry, through production at the Otway Gas Plant near Port Campbell and the Lang Lang Gas Plant, 80kms south-east of Melbourne CBD.

Beach successfully drilled one exploration well and six production wells in the Otway Basin offshore Commonwealth permits over the past four years. Four production wells have been connected and are now producing gas for the east coast market, with two remaining wells still to be connected.

Beach is continuing its commitment to supply natural gas to the east coast domestic market and has commenced planning for the *Offshore Gas Victoria* (OGV) Project to deliver the next phases of exploration and development.

The OGV Project is planning activities across several phases and remains subject to a final investment decision. As planning progresses, project timings and final scope will be confirmed and updated in our communications. This information sheet focuses on drilling activities.

Seabed assessments

Assessment of suitable locations for drill rig and new seabed infrastructure to connect wells.

Earliest start Jan 2024

Removing wells

Removal of five legacy suspended wells through a formal procedure called 'plug and abandonment'.

Earliest start Nov 2024

Drilling wells

Up to 11 exploration, appraisal, or production wells.

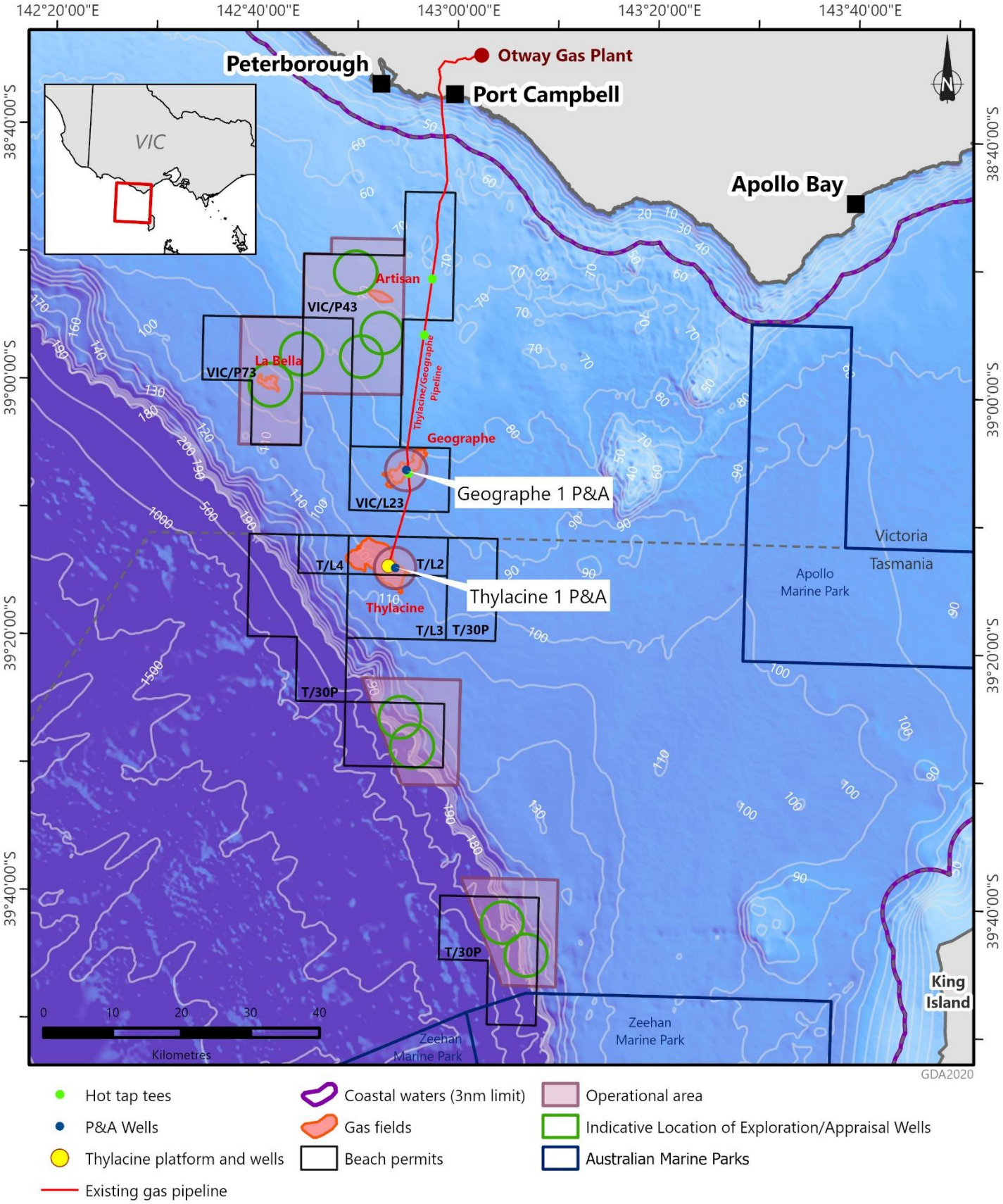
Earliest start Nov 2024

Completing & connecting wells

Completing successful wells, installing infrastructure, and connecting wells to existing pipelines.

Earliest start mid-2025

Otway Basin activity location map



21/12/2023

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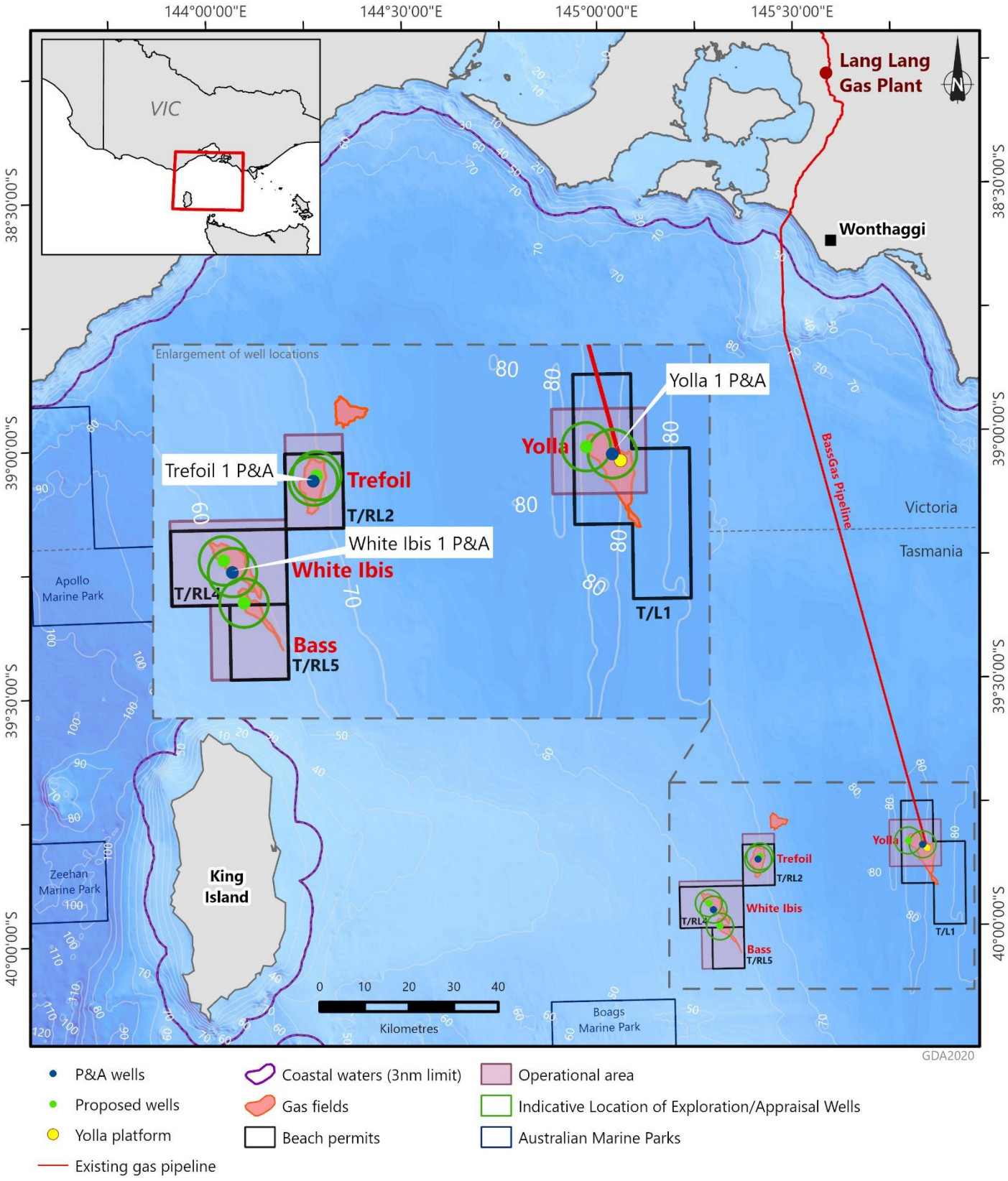
Bass Basin activity location map



21/12/2023

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OT23-0049A_R5

Project timing

Preliminary activities would start from January 2024 with seabed assessments to determine suitable drilling and infrastructure locations. Subject to internal and external approvals, plug and abandonment (P&A) of suspended legacy wells and drilling of new wells would commence from November 2024.

Each well would take between 25 to 50 days to drill depending on whether the well is viable and will be developed for production. Each P&A well would take approximately 15 days. The entire drilling program may take up to three years, depending on number of wells.

The final scope of activities, including number of wells, and the timing of activities will be subject to final investment decision, regulatory approvals, and the availability of the drilling rig after it completes programs of works for other companies. Beach will provide a detailed activity schedule prior to commencement.

Project locations

The OGV Project includes both the Otway and Bass offshore basins. In the Otway Basin two legacy wells would be P&A and up to six wells would be drilled. In the Bass Basin three legacy wells would be P&A and up to five wells would be drilled. All new wells would be within existing permits and the indicative well locations are shown in the maps on pages 2 and 3. The exact number of wells and their locations and the equipment to tie back to the existing pipelines are to be determined and will be communicated in further updates.

Environment protection regulations

The National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA), regulates activities in accordance with *the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations (2009)* (Environment Regulations). The OGV Project will require Environment Plans (EPs) to be accepted by NOPSEMA before commencement of activities. EPs will be prepared for different activity phases, including one EP covering drilling and P&A activities.

EPs must include a description of the existing environment, the proposed activities, an evaluation of the impacts and risks, environmental performance outcomes and controls, implementation strategy, and reporting requirements. They must also demonstrate that consultations with relevant persons whose functions, interests or activities may be affected by the activities in the EP ('relevant persons'), have been carried out in accordance with the regulations.

For successful gas wells that would be developed for production, an Offshore Project Proposal (OPP) will be required and will undergo a public consultation phase. Once an OPP is accepted, further EPs will be required for construction activities and commissioning the new wells.

Further information and consultation

This information sheet has been prepared to inform *Relevant Persons* whose functions, interests or activities may be affected by the activities to be carried out under the Environment Plan (EP) being prepared for the OGV Project drilling activities.

Consultation is an important part of developing EPs as its purpose is to ensure that potential impacts have been identified and appropriate measures adopted because of the consultations.

Please contact us if you would like further information, have any questions, or feedback, or wish to consult with us about how this project may impact your functions, interests, or activities.

Beach will consider all feedback, including any concerns or objections and will explore measures to reduce any impacts and risks.

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Environment description

EPs will include a detailed description of the existing environment in the immediate operational area and in the broader emergency planning area where there is a variety of marine fauna, including the presence of:

- Blue, humpback and fin whales, particularly during the summer months.
- Southern right and minke whales, particularly during the winter months.
- Common dolphins and shark species throughout the year.
- New Zealand and Australian fur seals throughout the year.
- Migratory birds.

There will be no drilling within marine parks. However, within the broader emergency planning area, there are National Marine Parks and State Marine Protected areas (see map).

Socio-economic and cultural values and sensitivities within the activity and emergency planning areas include:

- Commonwealth managed fisheries, including southern and eastern scalefish and shark, and southern squid jig fishery.
- Victorian managed fisheries, including rock lobster and giant crab.
- Commercial shipping activity.
- Sea Country cultural values and sensitivities held by First Nation peoples.
- Shipwrecks, primarily in close shoreline proximity.
- Recreational fishing.
- Recreational diving focussed on shipwrecks and reefs close to the shoreline.
- Signficant tourism features and activities associated with the Great Ocean Road, Twelve Apostles and Bay of Islands Coastal Park.

Impacts, performance outcomes and controls

Beach recognises the environmental, cultural, heritage, social and economic values in our activity and planning areas.

We have a proud track record for safety and environmental performance, adhering to performance measures set out in EPs and Safety Cases accepted by regulators.

EPs will detail potential impacts on the environment, and provide performance outcomes and standards, and control measures to reduce and manage environmental impacts and potential risks to ALARP and acceptable levels, and follows the principles of ecologically sustainable development. ALARP stands for 'As Low As Reasonably Practicable'. It is an assessment principle commonly used in the oil and gas industry to assess and reduce potential impacts and risks that cannot be eliminated. For information on how NOPSEMA assesses ALARP see: ALARP Guidance Note (nopsema.gov.au).

A summary of the key impacts, mitigations and management plans can be found here.

Marine mammal protection

EPs will set out detailed control measures that are consistent with marine mammal management plans that have been produced by the Federal Government under the *Environment Protection and Biodiversity Conservation (EPBC) Regulations (2000)*.

These control measures are based on the avoidance of collision or entanglement of marine mammals, reducing vessel speeds, and minimising any anchor lines. The control measures also focus on the reduction of marine noise from vessel and drilling rig activities, so any noise produced does not impact the behaviour of a protected marine mammal.

Dedicated Marine Mammal Observers will be deployed on vessels to advise vessel captains and the drilling rig of protected marine mammals near our activities.

All whale sightings will be recorded along with the actions taken to avoid potential impacts.

Commercial fishing control measures

The project activities would occur among commercial Commonwealth and State fisheries, which cover vast areas. The drilling activities require access to relatively small areas for short periods of time. EPs will set out detailed assessment of fisheries and fishing activity that may overlap the project activities.

Beach will consult with commercial fishers on arrangements to ensure each other's operational plans are understood, helping to minimise any impacts to fishing activities and to OGV Project.

Beach will provide regular updates on its operations to fishing associations throughout the duration of the activities.

Beach has a *Fair Ocean Access* procedure, which sets out Beach's commitment to consultation, minimising impacts of its activities, the circumstances in which a fisher may claim compensation, the evidence required and the claim process.

Recognising cultural values and sensitivities

The project operations would occur in the Sea Country adjacent to coastal First Nations groups including: Eastern Maar Aboriginal Corporation; Gunditj Mirring Traditional Owner Corporation; Wadawurrung Traditional Owners Corporation; Bunurong Land Council Aboriginal Corporation; Gunaikurnai Aboriginal Land Council Tasmania; Flinders Island Aboriginal Association; and Tasmanian Aboriginal Centre.

Beach is consulting with these groups to identify cultural values of Sea Country so that they can be assessed for any potential impacts and control measures that may be required in the preparation of the drilling EP (and other EPs).

In addition to cultural values identified through consultation, Beach has engaged a suitably qualified maritime archaeologist who will assess data gathered in the seabed assessment surveys. For any identified cultural landscape values and sensitivities within the activity area an underwater cultural landscape management plan will be developed.

Operating safely

At Beach, safety takes precedence in everything we do. The drilling rig would have a dedicated Safety Case that must be accepted by NOPSEMA. Marine vessels and the drilling rig contracted by Beach will operate in accordance with Australian Maritime Standards, regulated by the Australian Maritime Safety Authority (AMSA). This includes adherence to the following protocols at sea:

- Notifications to the Australian Hydrographic Office before mobilising to the operational area, moving to different drilling locations, and when demobilising.
- Communication with other vessels and marine users will occur using standard maritime protocols.
- Safe operating distances will be maintained around all vessels and the drilling rig at all times.
- Compliance to Navigational Safety requirements, including lighting and Automatic Identification System.

Exclusion zones

When the drilling rig is on a well location, all vessels are required to be abide by a 2-kilometre radius cautionary zone around the drilling rig. The cautionary zone is to allow for anchors, mooring chains, and wire to be placed within the operational area during the drilling program. Exact locations of mooring chains and anchors would be made available before the start of drilling each well.

There will also be a Petroleum Safety Zone (PSZ) of 500 metres around the drilling rig during operations and for each well before and after drilling. Beach will communicate new PSZs created for wells and equipment to marine users as part of its ongoing consultation. PSZs are administered by NOPSEMA under Section 616 of the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGS Act). PSZs extend for a radius of up to 500 metres and are gazetted around wells, structures, and equipment.

Entry into PSZs is prohibited to all except those vessels authorised to do so by NOPSEMA (as detailed in the gazetted notice) or exempt under Section 615 of the OPGGS Act. PSZs are shown as a 'Restricted Area' on navigation charts.

Emergency planning

When conducting any offshore activity, there is an extremely unlikely risk of release of hydrocarbon (which is primarily gas) from a well during drilling or from marine vessel fuel in the event of an accident.

Beach standard operating procedures include emergency response plans, which are included in EPs. Preparing emergency response plans involves modelling of all possible hydrocarbon releases in the local area using a worst-case scenario, assuming no control measures are in place. The modelling calculates the transport, spreading, entrainment and evaporation over time, using data on the prevailing metocean conditions (wind, wave, and climate), the volume released, and the physical and chemical properties of the hydrocarbons.

The modelling determines the full extent of the 'Environment that may be affected' known as the EMBA. EPs must describe the EMBA and include an assessment of the likelihood and consequences of any hydrocarbon release, which must be reduced to ALARP through a range of control measures and include detailed response plans.

An emergency response plan describes the arrangements that must be in place for responding to and monitoring any release of hydrocarbon and include:

- 24/7 on-call team for rapid response clean-up actions, including mobilisation of personnel and equipment.
- 24/7 on-call team for modelling and monitoring of a hydrocarbon release to inform

response activities, and monitoring of effectiveness of response activities.

- Control measures necessary for ensuring rapid response and maintenance of capabilities (personnel and equipment).

These arrangements are based on the worse case event associated with the proposed activities to ensure that Beach has the appropriate level of response arrangements and capability.

Beach maintains a current contract with Australian Marine Oil Spill Centre (AMOSC) based in Geelong for access to spill response resources and personnel. In Victoria, the Department of Transport is the control agency for marine pollution emergencies. Beach also conducts exercises to test the emergency response plans and identify any issues and improvements before, and during operations.

For more information on hydrocarbon release modelling and why it is required for the preparation of EPs, click here to watch a video on the NOPSEMA website.

Offshore drilling approach

Depending on the size and geological structure of hydrocarbon reservoirs, the sequence of drilling often involves:

1. an exploration well into a prospective hydrocarbon reservoir identified in a previous seismic survey.
2. an appraisal well to establish the size of the reservoir.
3. then completing a well to become a production well that would be tied back to a platform and / or pipeline.

Beach's program of work would be optimised in well design and equipment so that exploration and appraisal wells would be drilled to the same specifications as a production well. By taking this approach, if the wells are assessed as viable for production, at the end of drilling they would be completed ready for connection. If they are assessed as unviable, they would immediately undergo the formal P&A process.

This approach will reduce the number of drilling activities and the time taken to explore, appraise and convert a well through to production, thereby also reducing environmental impacts from the activities.

Key steps in the drilling program

The approach to drilling is summarised in the following key steps *(see diagram over page)*.

- Using an approved shipping route specialist anchor handling vessels (AHSVs) will manoeuvre the drilling rig into place.
- Mooring equipment will be pre-laid by the AHSVs and the rig will be connected at sites determined as suitable by the seabed assessments.
- Conductor and surface hole sections will be drilled and cased, then a marine riser and Blow-out Preventer (BOP) installed.
- The well would then be drilled to reach the gas reservoir beneath the seabed.
- The rig would be moved from one well to the next, repeating the anchoring and drilling process.

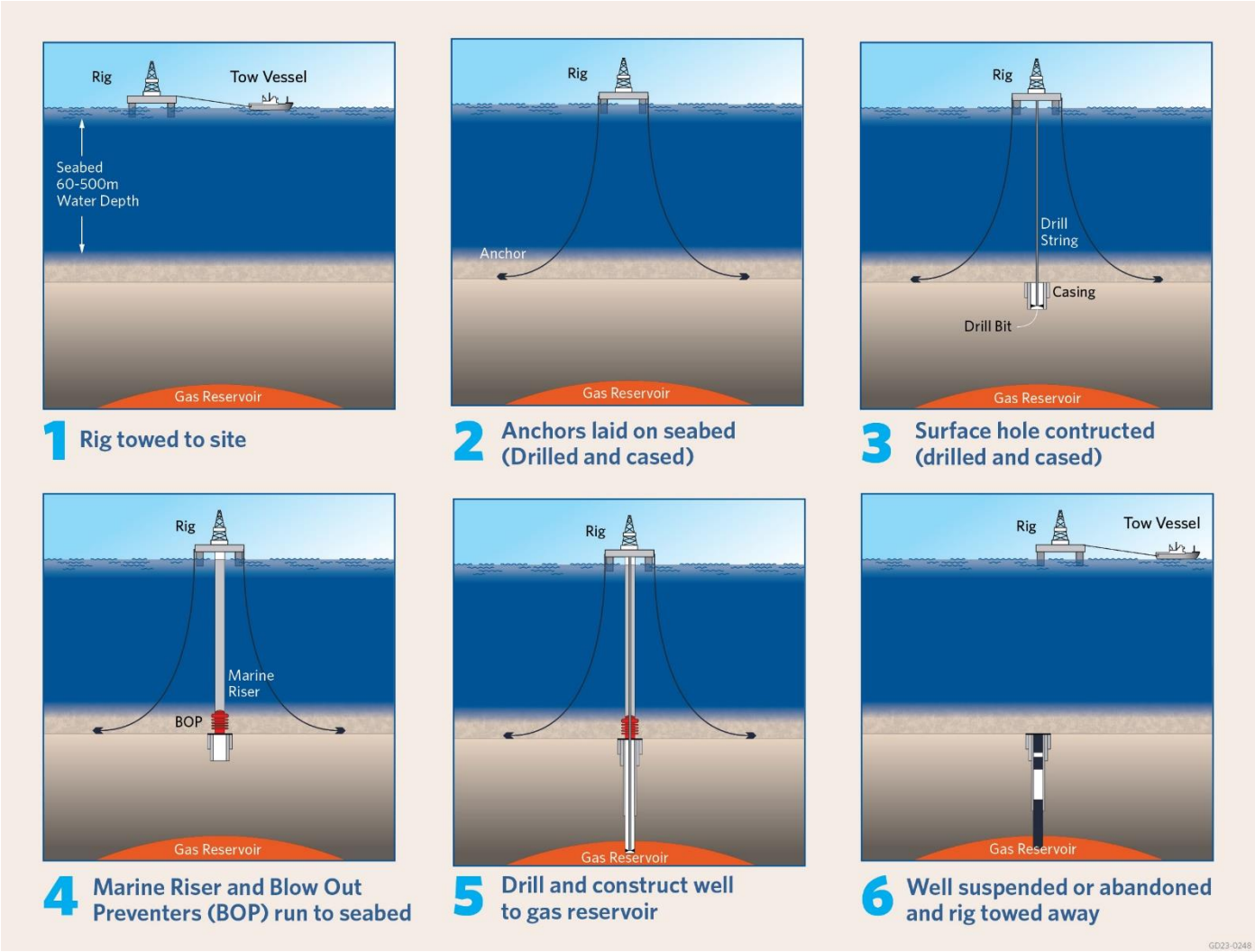
Transocean Equinox Semi-submersible drill rig

Drilling methodology

Beach would use the Transocean Equinox, which is a modern semi-submersible drilling rig designed for harsh weather and sea conditions. It can operate in waters up to 500m deep, drill for gas at up to 8,500m deep and accommodate 130 crew.

This type of drilling rig is commonly used for operations on the Norwegian Continental Shelf. Its design incorporates the latest technologies that mechanise hazardous operations enhancing the safety of personnel, improves fuel efficiency and utilises emissions reduction and monitoring systems.

The rig is equipped with a marine riser and Blow Out Preventer (BOP) which is a highly specialised valve unit weighing approximately 244 tonnes and measuring 14 metres high. A BOP is used in all drilling operations however the offshore rig BOP is more robust with 100% duplication of functionality.



The BOP is used to shut-in and seal off a well in the event of an unplanned pressure build up or 'kick'. Beach engineers use a rigorous process for the design of construction and operation of wells which, when combined with the rig contractor procedures and BOP equipment, ensures:

- well integrity throughout the drilling process and, in the case of production wells throughout the well lifecycle.
- ongoing personnel safety.
- prevention of any environmental incidents.

The drilling process would run over several stages starting with a top-hole section of approximately 36-inches in diameter, then reducing in diameter to consecutively smaller sizes until the well reaches the final target depth. For each section, a casing (steel pipe) would be placed in the hole and cemented in place, then a smaller drill bit would be run through the casing to drill a smaller hole to the next target depth and the process repeated to reach the final depth. This is usually several kilometres below the seabed.

Drilling muds

Beach OGV Project drilling operations would use only water-based fluids called 'muds' to lubricate and stabilise the wellbores in each section and remove drilling cuttings. Drill cuttings are rock chips from the sedimentary layers that emerge from the drilling process and would range from very fine to coarse in size.

Water based muds are recycled as much as possible during the drilling process. The cuttings would be processed on the drilling rig before they are discharged overboard, where they will settle rapidly on the seafloor around the well site. This is standard industry practice in Australia.

Marine mammals and fish may transit through these areas but will usually avoid the temporary disturbance. Any exposure to suspended sediment before it settles on the seabed will be highly localised and temporary due to high dilution and fast dispersal in the water column.

Production well connections

When the production wells have been completed, they would be connected to seabed infrastructure and the existing offshore to onshore pipeline.

Some seabed infrastructure for tying in the new wells is already in place and connected to the existing pipelines.

Additional infrastructure for any new production wells would also be installed to tie-in to the existing pipeline. New infrastructure would typically include:

- Diving Integration Skid, which is a module that is installed on the seabed by divers from a dive support vessel and connected to an existing pipeline connection (hot tap) or offshore platform, ready for later connection of flowlines from the wells.
- Flowlines and various subsea connection modules to connect the production wells to the existing platform and pipeline.
- Electrical and hydraulic controls within cables that enable remote monitoring and control of the production wells.
- Concrete mattresses will be installed over the flowlines and/or umbilicals for stabilisation and protection as required.

A construction support vessel using an ROV would install the equipment and commission the production wells after they are connected.

Plug and abandonment process

If a well is commercially unviable and for the removal of existing suspended wells a formal plug and abandonment process would be carried out. Beach engineers design the well abandonment in compliance with the Norwegian Norsok and Oil and Gas UK standards industry best practice and guidelines, for example the Oil and Energy UK (OEUK) guidelines; standards that are recognised by NOPSEMA as current industry best.

Multiple cement plugs would be installed within the well to permanently seal the well and isolate any productive or water bearing formations reservoirs or hydrocarbon bearing zones.

An additional cement plug would be installed at the seabed and all casings will be cut and recovered from at least 2 metres below the mudline to ensure that the seabed is returned to the same condition as it was prior to drilling operations commencing.

OGV P&A Information Sheet Updated

Offshore Gas Victoria Project

Plug and abandonment activities

Yolla Platform, Bass Strait

Plug and abandonment activities | October 2023

Project overview

Beach Energy supplies the ongoing natural gas needs of Victorian homes, business and industry, through production at the Otway Gas Plant near Port Campbell and the Lang Lang Gas Plant, 80kms south-east of Melbourne CBD.

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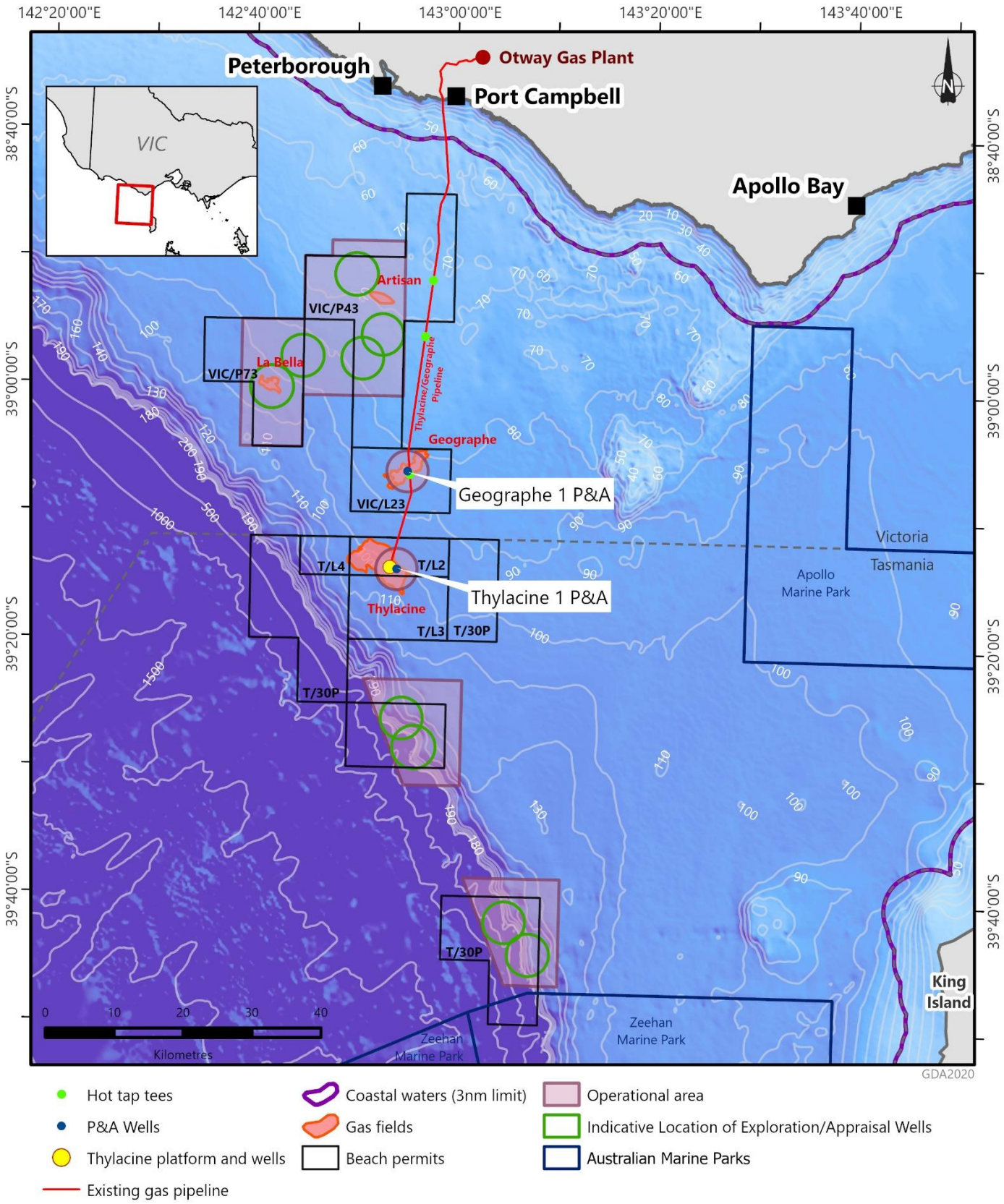
Beach is continuing its commitment to supply natural gas to the east coast domestic market and has commenced planning for the *Offshore Gas Victoria* (OGV) Project to deliver the next phases of exploration and development.

The OGV Project is planning activities across several phases and remains subject to a final investment decision. As planning progresses, project timings and final scope will be confirmed and updated in our communications. This information sheet focuses on the Plug and abandonment (P&A) activities.

Seabed assessment	Removal of wells	Drilling of wells	Completing and connecting of wells
Assessment of suitable locations for drill rig and new seabed infrastructure to connect wells	Removal of five suspended wells through a formal procedure called 'plug and abandonment'	Up to 11 exploration / appraisal wells	Completing successful wells, installing infrastructure, and connecting wells to existing pipelines
Earliest start January 2024	**Earliest start January 2025**	**Earliest start Feb 2025**	**Earliest start mid-2025**

Otway Basin



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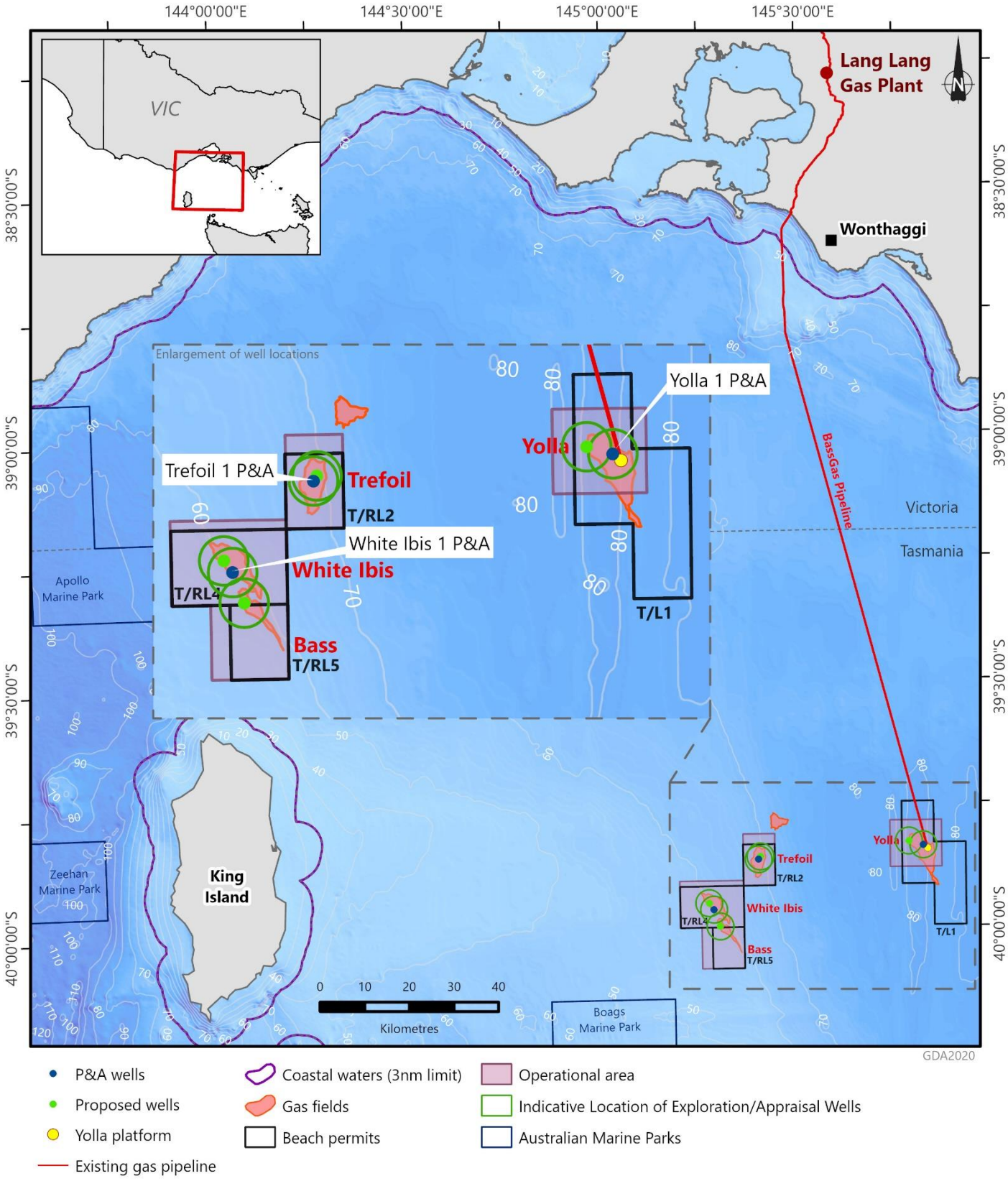
Bass Basin



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OT23-0049A_R5

Plug and abandonment

The OGV Project is a continuation of Beach's previous Phase 4 and 5 projects and may contain up to 11 wells to be drilled over approximately two years. Beach's program of work has been optimised to allow for the permanent P&A of five suspended wells. These wells are isolated from hydrocarbon zones and are managed in accordance with a Wells Operation Management Plan to ensure well integrity.

Suspended exploration wells are P&A when they are not suitable as future production wells due to limited gas prospectivity. Cement plugs will be installed within the well to permanently seal the well and isolate it from formations. A cement plug will be installed at or close to the seabed and all casings will be cut at least 2 m below the mudline to ensure that the seabed is returned to the same condition prior to drilling (P&A). Debris in vicinity will also be surveyed and retrieved where feasible to do so.

The P&A of wells is often planned to coincide with the drilling of new exploration or production wells using the same drilling rig which is the case with the OGV Project.

Questions and Answers

When were the wells drilled?

The wells were drilled by previous lease titleholders, from 1985 through to the most recent well being drilled by Origin Energy in 2004. Beach and its joint venture partners acquired the retention leases and production licence, the wells and associated production assets from Origin Energy in 2018.

Why are you decommissioning the suspended wells?

Although Beach is continuing development of natural gas in the Otway and Bass Basins, the suspended exploration wells are not suitable as future production wells. In addition, new exploration wells will be P&A shortly after drilling should results show limited prospectivity.

Are the suspended wells monitored for leaks?

Cement plugs were installed to suspend and seal the wells. Since then, the wells have undergone routine monitoring and have met inspection criteria.

Although unlikely given the well construction method, if a leak was found during an inspection, the hydrocarbon volume and composition would be assessed in order to determine the required maintenance response or 'plug and abandonment' action.

No leaks have been observed from all suspended wells inspections to date.

Consultation and Feedback

Consultation and feedback is an important part of developing Environmental Plans and Offshore Project Proposals.

This information sheet has been prepared to provide a summary of proposed activities and commence consultation with relevant persons whose functions, interests or activities may be affected by the activities to be carried out under the environment plan.

Please contact us if you would like further information or to consult with us about how this project may impact your functions, interests or activities.

Beach will consider all feedback, including any concerns or objections and will explore measures to reduce any impacts and risks.

Relevant persons may request that the information they provide not be published, and it will be identified as sensitive information and not published in the EP.

If there is someone you believe may be affected by the proposed activities, please have them contact us.

P: 1800 797011

E: community@beachenergy.com.au

beachenergy.com

beach

Summary of Impacts and Risks for Beach Drilling Program

Aspect - Planned	Relevant Activities	Potential Impact	Summary of Beach Control Measures
Light emission	Drill rig and support vessels	Drilling rig and vessels lighting is required for navigational and safety purposes. Artificial light may attract light sensitive species such as shorebirds, seabirds, and turtles.	• Drill rig and vessel and drill rig lighting complies with Australian Maritime Safety Authority (AMSA) Marine Orders Part 30 (Prevention of Collisions). • Beach Seabird Lighting Management Plan is implemented on the drill rig and vessels and details: ○ Non-essential lights are turned off when not in use. ○ Lighting is directed onto work areas. ○ Window screens or blinds are closed at night. ○ Crew environmental induction covers handling and reporting requirements for grounded or injured birds.
Seabed disturbance	Drill rig and support vessels	Temporary and localised seabed disturbance with associated loss of benthic habitat or disturbance to cultural or heritage feature may occur from: • Drill rig anchoring • Drilling cuttings and cement discharges	• Assessment of the seabed to identify and avoid, where possible, any key environmental, heritage or cultural features. • Drill rig anchoring procedures. • Vessels use dynamic positioning rather than anchor. • Beach Chemical Management Plan requires that drill fluids, cement and grout are selected to ensure the lowest toxicity, most biodegradable and least accumulative products selected which meet the technical requirements of the application.
Underwater sound	Drill rig, support vessels and helicopters	Temporary disturbance to marine fauna may occur from underwater sound emissions from: • Vessel engines and thrusters • Helicopters	• Engines and thrusters are maintained in accordance with manufacturer's instructions via the Planned Maintenance System to ensure they are operating efficiently. • Vessel and helicopters comply with the EPBC Regulations 2000 – Part 8 Division 8.1 interacting with cetaceans which details minimum separation distances.

Aspect - Planned	Relevant Activities	Potential Impact	Summary of Beach Control Measures
		• Drill rig engines and drilling equipment	• Beach Whale Management Procedure is implemented on vessels and drill rig and requires: ○ Pre-activity survey undertaken for 30 min to identify whales that maybe within the activity area affected by underwater sound. ○ If a whale is sighted, the activity will not commence until no whales have been observed within the activity area affected by underwater sound for 30 minutes or whales have been observed leaving this area. ○ Once the activity has commenced observations are undertaken within the activity area affected by underwater sound. If a whale is sighted within this area the following will occur: ▪ If the vessel can do so it will move away from the whale and maintain a minimum separation distance equal to the activity area affected by underwater sound. ▪ If the vessel cannot move away from the whale, it will reduce thrusters if safe to do so. The activity will cease as soon as it is safe, and the vessel will move out of the activity area affected by underwater sound. ▪ For drilling where the drill rig cannot move away, once drilling has reached a safe point it will not restart until no whales have been observed within the activity area affected by underwater sound for 30 minutes or whales have been observed leaving this area. • Vessels have a dedicated MMO with experience in whale observation, distance estimation and reporting to implement the Beach Whale Management Procedure, for activities undertaken over a period greater than 24 hours. • In addition, vessel crew who act as Officer of the Watch receive training from the MMO in whale observation and distance estimation to assist the MMO during daylight hours. • For activities greater than 5 consecutive days at sea an additional dedicated MMO trained in whale observation, distance estimation and reporting are onboard the vessel to support the experienced MMO. • For activities that are undertaken over a period less than 24 hours the vessel Officer of the Watch undertake whale observations. They are trained in the Beach Whale Management Procedure, whale observation and distance estimation.

Aspect - Planned	Relevant Activities	Potential Impact	Summary of Beach Control Measures

Physical presence	Drill rig and support vessels	The physical presence of Petroleum Safety Zones, prelaid anchors, vessels and drills rigs can result in the displacement of other marine users and snagging of fishing equipment.	• Consultation with relevant person that may be affected by the activity is undertaken as part of developing the environment plan and is ongoing prior to and during the activity to avoid or limit any displacement.
			• Petroleum Safety Zones, administrated by NOPSEMA under the OPGGS Act, are clearly marked on navigational charts.
			• Beach's Fair Ocean Access Procedure details the process whereby a commercial fisher can claim compensation for an economic loss associated with Beach's offshore activities where impacts cannot be avoided.
			• Vessels and drill rigs comply with:
			  ○ AMSA MO 30: Prevention of collisions requires that onboard navigation, radar equipment, and lighting meets the International Rules for Preventing Collisions at Sea (COLREGs) and industry standards.
			  ○ AMSA MO 27: Safety of navigation and radio equipment gives effect to SOLAS regulations regarding radiocommunication and safety of navigation and provides for navigation safety measures and equipment and radio equipment requirements.
			• Prelaid anchors are equipped with a surface buoy with a navigation light to ensure any marine users know of their presence.
			• The position of the prelaid anchor buoys are monitored to ensure that the buoys and anchor chains remain in place.
			• The Australian Hydrographic Office is notified of the activity at least three weeks prior to commencement to enable the promulgation of Notice to Mariners and AusCoast navigational warnings.

Marine discharges	Drill rig and support vessels	Drill rig and vessels discharge cooling water, brine, bilge water, deck drainage, putrescible waste, sewage, and grey water. Marine discharges can result in changes in water quality such as increased temperature, salinity, nutrients, chemicals, and hydrocarbons.	• Drill rig and vessels comply with Protection of the Sea (Prevention of Pollution from Ships) Act 1983 which gives effect to MARPOL Annex IV relating to discharge of noxious liquid substances, sewage, and putrescible waste. • Equipment to treat marine discharges are maintained in accordance with manufacturer's instructions via the Planned Maintenance System to ensure they are operating efficiently. • Oil contaminated water is treated via a MARPOL (or equivalent) approved oily water separator and only discharge if oil content less than 15 ppm.

Aspect - Planned	Relevant Activities	Potential Impact	Summary of Beach Control Measures
			• Sewage discharged at sea is treated via a MARPOL (or equivalent) approved sewage treatment system. • Food waste only discharged when macerated to ≤25 mm and at distance greater than 3 nm from land. • Beach Chemical Management Plan requires that any chemicals within marine discharges are selected to ensure the lowest toxicity, most biodegradable and least accumulative products selected which meet the technical requirements of the application.
Drilling discharges	Drill rig P&A	During drilling discharges such as blow out preventer hydraulic fluids, drill fluids and cuttings and cement can result in localised changes in water and sediment quality. A small amount of metal shavings may be discharged during the well head cutting for the P&A campaign.	• Drill rig blow out preventer function and pressure testing is a safety requirement and is undertaken in accordance with manufacturer's specifications and in alignment with Drilling Contractors Preventative Maintenance System. • Beach Chemical Management Plan requires that any chemicals within drilling discharges are selected to ensure the lowest toxicity, most biodegradable and least accumulative products selected which meet the technical requirements of the application. • Non water-based fluids and cuttings are circulated to the drill rig for treatment via the solids control equipment prior to discharge. • Cementing procedures are implemented to minimise the amount of cement discharged to the marine environment, including the minimisation of excess cement discharge upon completion of the drilling program.

Atmospheric emissions	Drilling
	P&A
		Combustion of marine diesel oil (MDO) from the vessel and drill rig engines, generators and deck equipment, waste incineration and flaring well test fluids may cause a localised and temporary decrease in air quality and add greenhouses gas (GHG) into the atmosphere.	• Drill rig and vessels comply with Marine Orders – Part 97: Marine Pollution Prevention – Air Pollution (appropriate to vessel class) for emissions from combustion of fuel including:
			  ○ hold a valid International Air Pollution Prevention certificate and a current international energy efficiency certificate.
			  ○ have a Ship Energy Efficiency Management Plan to reduce emissions.
			  ○ engine NOx emission levels comply with Regulation 13 of MARPOL 73/78 Annex VI.
			  ○ low-sulphur (<0.5% m/m) diesel used.
			• Combustion equipment maintained in accordance with manufacturer's instructions via the Planned Maintenance System to ensure they are operating efficiently.

Aspect - Planned	Relevant Activities	Potential Impact	Summary of Beach Control Measures
			• Waste incineration is managed in accordance with MARPOL and AMSA Marine Orders. • For well test flaring the minimum volume of hydrocarbons is used and flared via an efficient test flare burner head.

Aspect - Unplanned	Relevant Activities	Potential Impact	Summary of Beach Control Measures
Introduction and establishment of invasive marine species (IMS)	Drill rig and support vessels	The introduction of IMS may occur as a result of discharge of drill rig and vessel ballast water containing foreign species or translocation of foreign species through biofouling on hulls, niches or in-water equipment. The potential impacts of marine pest introduction include: • Change in native marine species diversity and abundance. • Change in commercial fish stocks and associated socio-economic effects. • Changes to conservation values of protected areas.	• Prior to the initial mobilisation for an activity by a vessel, drill rig or submersible equipment, Beach shall undertake a domestic IMS biofouling risk assessment to: ○ Validate compliance with regulatory requirements (Commonwealth and State) in relation to biosecurity. ○ Identify the potential IMS risk profile. ○ Identify potentially deficiency of IMS controls and additional controls to manage IMS risk profile at low. ○ Prevent the translocation and potential establishment of IMS into non-affected environments. • Suspected or confirmed IMS introduction are reported to Agriculture Victoria.
Vessel collision or disturbance of fauna	Support vessels	Vessels have the potential for collision with marine mammals which may cause injury or death. Marine fauna entanglement in drill rig anchor chains is not identified as a risk die to the thick chain links.	• Vessels comply with the EPBC Regulations 2000 – Part 8 Division 8.1 interacting with cetaceans which details minimum separation distances. • Vessels have a dedicated MMO with experience in whale observation, distance estimation and reporting to implement the Beach Whale Management Procedure, for activities undertaken over a period greater than 24 hours. • In addition, vessel crew who act as Officer of the Watch receive training from the MMO in whale observation and distance estimation to assist the MMO during daylight hours.

Aspect - Unplanned	Relevant Activities	Potential Impact	Summary of Beach Control Measures
			• For activities greater than 5 consecutive days at sea an additional dedicated MMO trained in whale observation, distance estimation and reporting is onboard the vessel to support the experienced MMO. • For activities that are undertaken over a period less than 24 hours the vessel Officer of the Watch undertake whale observations. They are trained in the Beach Whale Management Procedure, whale observation and distance estimation. • Vessel strike causing injury to, or death of a cetacean is reported to the Department of Climate Change, Energy, the Environment and Water.
Accidental discharge materials and waste	Drill rig and support vessels	The handling and storage of materials and waste on board a vessel or drill rig has the potential to result in accidental overboard release creating marine debris.	• Waste is managed in accordance with the Garbage Management Plan. • Waste with potential to be windblown shall be stored in covered containers.t • Solid waste that is accidentally discharged overboard is recovered if reasonably practicable. • Crane handling and transfer procedures implemented to avoid objects being dropped overboard. • Lifting gear is maintained in accordance with the Preventative Maintenance System and inspected regularly to ensure they are operating efficiently.
Minor spills	Drill rig and support vessels	Minor spill from vessels and drill rig can occur from • use, handling and transfer of hydrocarbons and chemicals • hydraulic line failure from equipment • bunkering of material between the drill rig and support vessel A minor spill would be limited to a localised and temporary change in water quality and the potential change to fauna behaviour within surface waters affected by the spill, such as avoidance.	• Bunkering is undertaken in accordance with Drilling Contractor bunkering procedures which include: ○ Bunkering operation supervised at all times by trained and experienced personnel. ○ Hoses have dry-break couplings and floats. ○ Transfer equipment (hoses, pumps) maintained in accordance with manufacturer's instructions via the rig and vessel Planned Maintenance System and inspected prior to use. ○ Tanks have level indicators and level alarms. ○ Communications (visual and audio) between vessel and drill rig tested prior to commencing bunkering. • Materials and equipment that have the potential to spill onto decks or marine environment are stored within a contained area. • The following plans are implemented in the event of a spill:

Aspect - Unplanned	Relevant Activities	Potential Impact	Summary of Beach Control Measures
			○ Shipboard Marine Pollution Emergency Plan (SMPEP) or Shipboard Oil Pollution Emergency Plan (SOPEP) (according to class). ○ Beach Offshore Victoria Oil Pollution Emergency Plan (OPEP). Project-specific Operational and Scientific Monitoring Program (OSMP).
Loss of containment – marine diesel oil (MDO)	Support vessels	MDO is used in offshore vessels. A collision between a Beach contracted vessel and third-party vessel has the potential to result in a spill of fuel. Causes of a vessel collision may include mechanical failure, loss of dynamic positioning, navigational error or foundering due to weather.	• Vessel collisions are avoided by: ○ Consultation with relevant person that may be affected by the activity is undertaken as part of developing the environment plan and is ongoing prior to and during the activity to ensure they know where activity vessels are and how to contact. ○ The Australian Hydrographic Office is notified of the activity at least three weeks prior to commencement to enable the promulgation of Notice to Mariners and AusCoast navigational warnings. ○ Vessels comply with: ▪ AMSA MO 30: Prevention of collisions requires that onboard navigation, radar equipment, and lighting meets the International Rules for Preventing Collisions at Sea (COLREGs) and industry standards. ▪ AMSA MO 27: Safety of navigation and radio equipment gives effect to SOLAS regulations regarding radiocommunication and safety of navigation and provides for navigation safety measures and equipment and radio equipment requirements. ▪ AMSA MO 21: Safety and emergency arrangements gives effect to SOLAS regulations dealing with life-saving appliances and arrangements, safety of navigation and special measures to enhance maritime safety. • Vessels have an automatic identification system (AIS) transceiver enabling them to receive the data broadcasted by surrounding vessels. • Vessels contracted to conduct activities only carry marine diesel. • The following plans are implemented in the event of a spill:

Aspect - Unplanned	Relevant Activities	Potential Impact	Summary of Beach Control Measures
			○ Shipboard Marine Pollution Emergency Plan (SMPEP) or Shipboard Oil Pollution Emergency Plan (SOPEP) (according to class). ○ Beach Offshore Victoria Oil Pollution Emergency Plan (OPEP). ○ Project-specific Operational and Scientific Monitoring Program (OSMP).
Loss of containment – Condensate	Drill rig	A loss of containment resulting in a spill of condensate could occur from: • loss of well control while drilling or P&A	• Part 5 of the Offshore Petroleum and Greenhouse Gas Storage (Resource Management and Administration) Regulations 2011 set out the requirements for WOMPs. Producing, suspended and wells being drilled must have a NOPSEMA accepted WOMP detailing: ○ identify the risks to well integrity. ○ describe how the risks are controlled. ○ describe the management system in place to ensure the controls are effectively and consistently applied. ○ describe the design, construction, operations, management and monitoring of the wells showing how risks to well integrity is reduced to ALARP. • Whilst drilling the drill rig blow out preventer is routinely function and pressure tested in accordance with manufacturer's specifications and in alignment with drill rig's Preventative Maintenance System. • Beach emergency response capability to implement timely source control in the case of a loss of well integrity is maintained in accordance with well-specific Source Control Contingency Plan (SCCP) and Relief Well Plan (RWP). • The following plans are implemented in the event of a spill: ○ NOPSEMA accepted Beach Offshore Victoria Oil Pollution Emergency Plan (OPEP). NOPSEMA accepted Project-specific Operational and Scientific Monitoring Program (OSMP).
Hydrocarbon spill response activities	Spill response	Spill response strategies may be accompanied by a range of environmental and socio-economic impacts.	Preparedness measures: • Beach undertakes a spill response drill prior to an activity commencing to test internal and external spill response arrangements and capability.

Aspect - Unplanned	Relevant Activities	Potential Impact	Summary of Beach Control Measures

			• Beach maintains a current contract with Australian Marine Oil Spill Centre (AMOSC) for access to spill response resources and personnel.
			• Beach maintains access to spill response capabilities (including capable personnel and equipment) to implement well-specific Source Control Contingency Plan (SCCP) and Relief Well Plan.
			Response measures:
			• NOPSEMA accepted Beach Offshore Victoria Oil Pollution Emergency Plan (OPEP) details:
			  ○ Notification and reporting requirements.
			  ○ Priority protection areas.
			  ○ Response strategies including resources and equipment required.
			  ○ Response actions and responsibilities.
			  ○ Environmental monitoring requirements as per the NOPSEMA accepted Project-specific Operational and Scientific Monitoring Program (OSMP).
			• Implementation of response strategies is undertaken in consultation with/or under direction of the Commonwealth and/or State Control Agency.

Portland Observer Notice of Community Session

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9am Macarthur
10.15am Portland
11am Heywood
CONTACTS
Portland Church Office 5523 2456
Heywood & Bolwarra Heather Stewart 5527 1368

DEATH

WINDSOR-FARLEY (nee Morris-sey) - Margaret passed away 12th July 2023 aged 94 years
You were the beautiful melody in the rhythm of life. Your love of music and dance will live on through us
Dearly loved mother and mother-in-law of Michael and Trudy. Adored Nana of Damon, Regina, Brendan and Mitch. Cherished great grandmother of Ivy and Willow
Rest in peace with Dad now

WINDSOR - FARLEY (nee Morris-sey) - Margaret Elizabeth 13/5/1929 - 12/7/2023
Loved mother and mother-in-law to Mary and Wally. Nanna to Olivia, Andre and Sarah. Great grand-mother to Lenny and Jagger. Twin sister to Suzie

MEMORIAM

SOPHIE WIESE
17/7/22
Loved wife of Marvin
Daughters - Jennifer Mrs Gall (1979), Blaine (1972)
Departed but never forgotten

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Community Information Sessions

To continue meeting natural gas demand from homes, business and industry, Beach Energy has commenced planning and consultation for the Offshore Gas Victoria (OGV) Project.

The drop-in sessions will enable local communities to learn more about the OGV Project which is considering a range of activity in Commonwealth waters across several phases. These include seabed assessments (non-seismic), drilling and connecting new wells, and removing suspended wells.

We are committed to working with our local communities, ensuring people are informed of our projects and can provide feedback. Stakeholder consultation is an important part of our planning as it helps identify any local concerns and ensures management of potential impacts.

Please drop in any time at one of our information sessions below if you would like to ask our technical staff questions about our projects, or to provide feedback.

Tuesday 25 July, 2023 2.00 PM to 7.00 PM
Lee Breakwater Road, Portland

Wednesday 26 July, 2023 2.00 PM to 7.00 PM
Warrnambool RSL, 1 Artillery Crescent, Warrnambool

We welcome your questions, please contact:

P 1800 797 011

E community@beachenergy.com.au

beachenergy.com.au/ogv/

READ MORE

OBSERVER SPORT

Portlanders bring home eightball trophy

SOME of Portland's best eightball players competed in the Ladies Border Challenge against Mount Gambier on the weekend with the local side bringing home the shield. The Portland players compete annually against Mount Gambier with Saturday's event held at the Heywood Bowling Club. Picture: SUPPLIED

Junior football super session

RANI KANE

THERE was a large contingent of junior footballers at Tyrendarra on Monday night with AFL Western District hosting a combined training session to focus on coaching, umpiring and playing development.

Koroit premiership coach Chris McLaren led the coaching staff while David Harris (AFL Victoria Umpiring Education and Support Lead) was in charge of the umpires.

Aimed at all junior clubs in the region, any aspiring coaches, umpires and players were encouraged to attend.

AFL Western District's Club Development Lead Matt Sealey said they are working to give learning opportunities to improve connectedness and participation across the region.

"We haven't had a session in a long time where clubs can all get together and train, so it was really nice to be able to do that," Sealey said.

"There was a big focus on coach development, research indicates that a bad coach experience is a major factor why junior players don't return to the game. We wanted any emerging coaches or coaches who have been coaching for a while but wanted to freshen up their skills or learn some new drills to take back to their teams."

There was also a focus on player engagement regarding umpire roles as well as specifics for aspiring umpires to learn.

"The umpiring part was really important, young players got an understanding of how to umpire games and what it feels like to umpire a game of football," Sealey said.

"So the session was about educating players about the role of the umpires – there was some fun games involved in all of that too.

"We also have young players who are playing their games and then doing boundary umpiring for other games, so we wanted to give them the skills to be confident."

Along with the learning component of the session, Sealey also hopes it helps to improve connection between clubs.

"It's all about embracing community connection too," she said.

"I know we all compete against each other on a Saturday, but we want to build the capacity of our junior football in the region so it's so important we're getting together and learning off one another.

"There is a lot of communication between clubs regarding premiers and playing Saturdays and Sundays and clubs are really good with that, so we want to keep building on that collaboration to boost our junior football."

JUNIOR footballers from across the region gathered at Tyrendarra on Monday night to participate in a super session training. Picture: SUPPLIED

Portland Table Tennis Association results

ROUND 10 of the Portland Table Tennis Association's season took place on Tuesday night, with two very close matches on show.

6 Amigos (G. Schroeder, K. Meaghan, D. Koenig, D. Belden, Noah Liersch, Z. Reeves) defeated AC/DC (R. Whiten, J. Mitchell, B. Koenig, Nathan Liersch, Koda MacLead, L. Burgess) 11 to 8.

Spectrum (M. Wynd, K. Rogers, E. Reeves, P. Hayman, Kirby MacLead, H. Bradbury) defeated Hit & Miss (D. Polkinghorne, J. Hurt, G. Brewster, T. Burgess, J. MacLead, J. Hobbs) 10 to 9.

Warrnambool Standard Notice of Community Session

Public Notices

PUBLIC NOTICE

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Community Information Sessions

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We welcome your questions, please contact:

P 1800 797 011
E community@beachenergy.com.au
beachenergy.com.au/ogv/

READ MORE

Public Notices

WARRNAMBOOL

ANNUAL GENERAL MEETING

On Tuesday 8th August at 7:30pm
The Meeting will be held at the Warrnambool Swimming Club Clubrooms,
Jamieson st Warrnambool
Please RSVP to the club secretary
Anna Jenkins
secretary@warrnamboolswimmingclub.com.au

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MISSION IMPOSSIBLE - DEAD RECKONING PT 1 (M) 163 MINS
SAT-MON/WED: 1:00PM 2.45PM^ 6.45PM
TUES: 1:00PM 2.45PM^ 6.40PM^
SPIDER-MAN: ACROSS THE SPIDER-VERSE (PG) 140 MINS (SDS)
SAT-WED: 5.45PM
TRANSFORMERS: RISE OF THE BEASTS (M) 127 MINS
SAT-WED: 12:00PM^ 6.40PM^
TUES: 12:00PM^ 9:00PM
NO HARD FEELINGS (MA15+) 103 MINS (SDS)
SAT-WED: 6:00PM
INDIANA JONES AND THE DIAL OF DESTINY (M) 154 MINS
SAT-WED: 10.00AM 2.30PM^ 6.15PM^
THE LITTLE MERMAID (PG) 135 MINS (SDS)
SAT-WED: 9:30AM
ELEMENTAL (PG) 109 MINS
SAT-WED: 9.45AM^ 12.15PM^ 4.15PM

(SDS)/(SE) = SCREENING DURING SUBS/WHEELCHAIR ACCESS (N) = NON AND BUD SESSION ON WEDNESDAY (CC) = CLOSED CAPTIONS (AD) = AUDIO DESCRIPTION SESSION TIMES ARE SUBJECT TO CHANGE WITHOUT NOTICE

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Cobden and Timboon Coast Times Notice of Community Session

Cobden Rotary celebrates year that was

COBDEN Rotary Club members have celebrated another busy year.

The club held its annual Changeover Celebration recently which gave members a chance to reflect on efforts to support not only the local community, but internationally as well.

Club president David Childs took time to outline the achievements of the past 12 month.

"It has been a pleasure and privilege to lead the Rotarians in Cobden through an active and rewarding year," he said.

"Having shared the presidency this year with Mark Towner, I want to thank my fellow Rotarians and friends and supporters for helping make this a successful year of community activity and fun together."

Locally, support for community projects and initiatives included:

- Smoke detector battery changeover program for elderly members of the community;
- Youth awards in schools;
- Literacy projects in schools, kindergartens and Cobden Library;
- Student welfare in schools;
- Community Christmas hampers;
- The Good Friday Royal Children's Hospital appeal;
- Contributions to Foodshare Warrnambool;
- Supporting the BRICKS Club; and
- A resident safety initiative at Cobdenhalth and the Cobden Scouts.

Support by the Rotary Club of Cobden for international projects included funding shelterboxes, Rotary International's 'End Polio Now' project, Rotary's broad international projects funds and funding for the shipment of recycled goods and equipment from Australia to developing countries.

Altogether the Rotary Club of Cobden's financial outlay for these projects and programs has totalled more than $25,000.

However, the time spent by Rotarians in fundraising, running activities and completing the projects equals over 25000 hours of volunteer time or $30,000 to $35,000.

Mr Childs said Rotarians were ordinary members of the community who want to serve the community through volunteer effort.

"While our club is relatively strong, having 13 active members at the present time, we are always looking for people with a similar desire for service to join us - either as members or as 'Friends of Rotary'," he said.

To find out more about the Cobden Rotary Club speak with Mr Childs or any member of the club.

George Hanks receiving his Paul Harris Fellowship at the recent Cobden Rotary Club changeover dinner, also pictured with Gary Kimber, David Childs and Kaye Hanks in photo. 2023E

Joyce Roberts with Paul Harris Fellowship award next to David Childs. 2023E

David Childs being inducted for another term as president by Annie McDowell. 2023E

Moyne Shire set to welcome new director

MOYNE Shire Council will welcome Ed Small as it's new director corporate and governance at the end of the month.

Chief executive officer Brett Davis said Mr Small will join Moyne from the Victorian Planning Authority where he has just finished as board secretary and was previous executive director of corporate services.

"Ed has extensive experience in both local and state government - including over 15 years as corporate services director at some of Melbourne's largest councils," he said.

"He is a qualified accountant and has high level experience in finance, governance and wider corporate strategy.

"He has been with the Growth Areas/ Victorian Planning Authority more recently in partnership with a range of metropolitan and regional councils.

"I'm looking forward to welcoming Ed to the team at Moyne and really excited about the level of experience he will bring to our executive team and the organisation."

Mr Davis said Mr Small would have responsibility for organisational services including finance, information technology, governance, people and culture, customer service, procurement, licensing and land management.

Mr Small will begin at Moyne on July 24.

yes, it's **our local** paper

WD NEWS PUBLICATIONS

Continuing the tradition

◆ Camperdown Chronicle ◆ Terang Express
◆ Cobden Timboon Coast Times ◆ Mortlake Dispatch

PUBLIC NOTICE

beach

Community Information Sessions

To continue meeting natural gas demand from homes, business and industry, Beach Energy has commenced planning and consultation for the Offshore Gas Victoria (OGV) Project.

The drop-in session will enable the local community to learn more about upcoming Beach projects:

- The OGV Project which is considering a range of activity in Commonwealth waters across several phases. These include seabed assessments (non-seismic), drilling and connecting new wells, and removing suspended wells.
- The Calico Survey (3D transitional zone seismic survey) which will be conducted between Nirranda South to the west and approximately 6km east of Port Campbell, out to 3 nautical miles offshore and approximately 4km inland.

We are committed to working with our local communities, ensuring people are informed of our projects and can provide feedback. Stakeholder consultation is an important part of our planning as it helps identify any local concerns and ensures management of potential impacts.

Please drop in any time at one of our information sessions below if you would like to ask our technical staff questions about our projects, or to provide feedback.

Monday 24 July, 2023 2.00 PM to 7.00 PM
Port Campbell Surf Life Saving Club,
1 Cairns Street, Port Campbell

We welcome your questions, please contact:

P 1800 797 011
E community@beachenergy.com.au
beachenergy.com.au/ogv/

READ MORE

Colac Herald Public Notice for Relevant Persons

POSITIONS VACANT

REACH AN AUDIENCE IN OUR CLASSIFIEDS

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CLASSIFIEDS

PHONE 5231 5322

Join our team

Administration Coordinator Planning

- An exciting opportunity to join our planning team in a 12-month fixed-term role
- Excellent benefits including a 19-day month
- Competitive salary, $70,666 - $78,534 based on qualifications and experience
- Based in Camperdown

This role is responsible for the effective and efficient coordination of the planning department's administration function. This includes assisting the Manager Planning and Building with a variety of tasks across several different planning functions.

Applications close 5 pm, Sunday 13 August.

Environmental Health Officer

- Permanent full-time, based in Camperdown
- Salary range $81,696 - $100,241 based on qualifications and experience
- Excellent benefits including a 19-day month
- Applications welcomed from both qualified and unqualified candidates with transferable skills

The Environmental Health Officer will be responsible for delivering Council's environmental health, including customer service, community education, statutory compliance and the research and production of innovative and effective policies, management plans and strategies.

If you're seeking a career change and have transferable skills, get in touch. Corangamite Shire can fully fund training to become an Environmental Health Officer for the right applicant.

Applications close 5 pm, Sunday 13 August.

Apply online: corangamite.vic.gov.au/employment

corangamite.vic.gov.au

WEBBER & CHIVELL FERTILISERS

29 COWLEYS ROAD
COBDEN, VIC 3266
Ph: 03 5594 6294
Fax: 03 5594 6321
ABN: 73 062 446 217

Positions Vacant

Webber and Chivell are seeking highly skilled operators to become part of a great team that prides itself on a professional and quality service to our clients.

This is a great opportunity to join an open and friendly work environment leading the way with the modern machinery and new technologies.

- The successful applicants would have to be self motivated and able to work with or without supervision.
- Have good customer and communication skills.
- Have a keen eye for detail and continual improvement.
- Good time management with a focus on safety.

We currently have 3 positions available listed below.

SPREADER DRIVER

This role is for a Spreader driver to operate one of our Modern Fleet of spreader trucks with the latest in vehicle management technology to apply fertilisers to our clients farms.

A heavy combination licence and tractor/agricultural experience would be preferred however training can be arranged for the right applicant.

DRONE PILOT

This role is for a Drone pilot to join our team to operate our growing fleet of drones in an exciting new area of the business. Spreading, Spraying, Mapping and other various tasks.

Training and licensing will be provided to the successful applicant.

LOCAL TRUCK DRIVER

This position is to operate our modern fleet of trucks to deliver product to our local farms with Rigid trucks and dog trailers.

A Heavy combination license is required to complete this role.

Each of these secure positions will be based out of our Jancourt depot located 10 K's east of Cobden. Remuneration will be based on experience.

For further information please contact Mark Webber & Chivell, 29 Cowleys Rd, Cobden, Vic 3266 Ph: (03) 5594 6294 Email: mark@webberchivell.com.au

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PUBLIC NOTICES

PUBLIC NOTICE

beach

Continuing to meet Australia's gas needs

Beach Energy supplies the Australian east-coast gas market through production at the Otway Gas Plant near Port Campbell and the Lang Lang Gas Plant 80km south-east of the Melbourne CBD. To continue meeting natural gas demand from homes, business and industry, Beach has commenced planning and consultation for the Offshore Gas Victoria (OGV) Project.

Activities and Timing

Subject to all required approvals, from early 2024, there will be several activities in offshore Commonwealth waters south of Port Campbell and in Bass Strait in existing production and exploration licenses held by Beach. Activities will involve different phases including seabed assessments (non-seismic), removing suspended wells, as well as drilling and connecting new wells to existing pipelines.

Environment Plans

The OGV Project will require Environment Plans to be accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) before commencement of activities.

Environment Plans must include a description of the existing environment and the proposed activities, an evaluation of the impacts and risks, environmental performance outcomes and controls, implementation strategy, and reporting requirements.

Consultation and feedback with Relevant Persons whose functions, interests or activities may be affected by the project activities is an important part of developing Environmental Plans.

Consultation

As a local operator in Victoria, Beach has conducted transparent and respectful consultations with Commercial Fishers, First Nations groups, local communities and other Relevant Persons for many years.

If you think your functions, interests or activities may be affected, we would like to consult with you to understand your concerns, and where possible, explore measures to reduce any impacts or risks.

Relevant Persons may request that the information they provide not be published in the Environment Plan.

If there is someone you believe may be affected by the proposed activities, please ask them to contact us.

Further Information

Project information sheets, activity location maps and further information on consultation can be accessed via the QR code below.

P 1800 797 011
E community@beachenergy.com.au

beachenergy.com.au/ogv

READ MORE

Cobden and Timboon Coast Times Notice for Relevant Persons

Email: ads@wdnews.com.au

Classifieds

Public Notices

PUBLIC NOTICE

beach

Continuing to meet Australia's gas needs

Beach Energy supplies the Australian east-coast gas market through production at the Otway Gas Plant near Port Campbell and the Lang Lang Gas Plant 80km south-east of the Melbourne CBD. To continue meeting natural gas demand from homes, business and industry, Beach has commenced planning and consultation for the Offshore Gas Victoria (OGV) Project.

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P 1800 797 011
E community@beachenergy.com.au

beachenergy.com.au/ogv

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Livestock/Cattle

CHARLES STEWART LIVESTOCK

EXPORT ORDERS

- Fres hfrs jnd sexed semen 6-18 weeks, minimum 380kg at delivery mid-Nov $2300+GST. MUST be lines of 20 or more Agent pre-approval required before sale.
- Jsy hfrs unj 200kg del late Sept $800+GST
- Ang hfrs 240kg+ del early-August $1200+GST
- Ang hfrs 240kg del late Sept $1100+GST
- Simm hfrs unj 240kg + del mid-August $POA
- Wagyu hfrs unj 220kg + del mid-August $4500+GST
- Wagyu x ang hfrs unj 220kg + del mid-August $1500+GST
- Wagyu x ang hfrs unj 220kg + del late Sept $1500+GST
- Wagyu x ang hfrs unj 220kg + del late Sept $1500+GST
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China protocols
Contact your Charles Stewart agent

WANTED

- Agistment for various lengths and cattle. Matt Baxter

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- 10 frs hfr calves,4 weeks old,All bred $250 +GST
- 30 frs x ang calves, mixed sex,6-12 weeks old, $250 +GST Lindsay Robb

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29/7/23 Irrewillipe Machinery & Sundry Clearing Sale As M & L Lockhart 10am Alan Whelan 0428 376 180
3/8/23 Mortlake Store Sale 10am Matt Baxter
8/8/23 CDownAssoc Agent Weaned Calf & Store Sale 10.30am Lindsay Robb

Matthew Baxter (Manager) 0428 926 614
Brian Gleeson 0417 132 077
Steve Lambert 0407 504 001
James Breen 0429 402 445
Malcolm Hallyburton 0418 384 152
Matthew Buckle 0427 358 900
Lindsay Robb 0427 501 791
Lochie McLauchlan 0457 427 737
Clarrie Smith 0407 058 174

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GOOD PRICE OFFERED
Call Gerard between 8am-9pm on 5566 5168 or 0409 245 895.

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WD NEWS PUBLICATIONS

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Churches

CAMPERDOWN, NOORAT, TERANG PRESBYTERIAN CHURCH
Sunday Services:
1st and 3rd Sundays at Camperdown 9.30am
2nd and 4th Sundays at Terang 9.30am
Weekly at Noorat 11am
Preacher: Reverend Damian Meeuwissen
Session Clerk: Tom Fleming 0408 529 467

PORT CAMPBELL BAPTIST CHURCH
Every Sunday at 10.30am
All welcome
This week's speaker: James O'Brien
Enquiries: Pastor Paul Pallot on 0408 791 321

UNITING CHURCH
Combined service for Cobden, Terang and Timboon Congregations
to be held at Cobden
10.30am Sunday July 30
Shared lunch to follow

South Gippsland Sentinel Notice of Webinar

Coasters ready to break into a new season

Coasters stars Ruby Morris and Jett Garnham are ready to ball out this season.

By Aiden Box

BASKETBALL is once again taking off in Wonthaggi and surrounding areas, with domestic, representative and Country Basketball League (CBL) each entering new seasons.

The Wonthaggi Amateur Basketball Association (WABA) will again field both a men's and a women's CBL side and look to be competitive in the region's highest and most competitive basketball competition.

The proud Wonthaggi club has undergone a few changes in the offseason, following another successful season in the CBL last summer, when their men finished sixth and their women fifth.

Both teams welcome new head coaches, with the men to be led by Andrew Mortimore and the women now under the guidance of Cath Garnham.

Fresh into their new roles at the helm, Andrew and Cathy spoke to the Sentinel-Times last week ahead of the CBL's opening round.

"It's what I'm used to, I'm much more comfortable with the seniors role, I've coached up in New South Wales in youth league men's, NBL1 and played in that league for about 20 years as well," Mortimore said.

"I'm feeling much more at home with the older boys."

"I took on the role since they're a good bunch of girls, they've had a bit of recent success and I'm hoping to get that next group of women coming through and getting them involved," said Garnham.

Neither coach is a stranger to the role or the club itself for that matter, the Garnham name is entrenched in the WABA and Cathy herself has coached many successful representative teams of all ages, she also has three supremely talented children who have and will represent the club with flying colours.

As for Andrew, he and his family moved to the area during the pandemic and has since invested his time in the junior portion of the WABA, coaching his 11-year-old son in his junior representative team, he will now take on the big job and coach his other son Will.

Will is touted to be a massive drawcard to the Coasters games with a wealth of experience and height, standing 6'10".

"He's been in boarding school in Sydney for the last three years, playing NBL1 in NSW, he's just turned 18 and won the NSW Youth League State Championship, which was a big win for his club in Maitland," Mortimore said.

Will Mortimore will look to gel early with his new teammates, one of whom Jett Garnham, who was a top ten scorer in the competition last season and has recently played Youth League basketball at the Dandenong Basketball Club, Jett is also one of Cath's sons, and will again line up alongside his older brother Jenson, in what shapes to be Wonthaggi's best and most exciting line up yet.

"What excites me about the boys is that they've got a bit of mongrel about them, which is great, they're young, fit, aggressive and our strength will be to use that intensity on the defensive end to create a bit of pressure," Mortimore said.

"We've got a bit of height coming in this year with Will, so the combination of speed, aggression and height should see us have a bit of extra oomph compared to last year."

With a new coach and a true power forward/centre coming into an already potent machine, the Wonny' men are primed to make a finals run, and have their sights set on doing so.

"We sat down at our first session and as a team we targeted a top three finish so we can have a great advantage going into finals, so that's where we're aiming this year," Mortimore said.

On the women's side of the tape, their new leader is pumped to get to work with her fresh and young squad.

"We're travelling well, we've got a few junior girls coming through the junior program, which is good, it shows that our pathways are all working, we've got a good mix," said Garnham.

"I think we have that blend of good youth and experienced heads as well, our older lot, that are only in their early 20s, they have that experience of winning the title two seasons ago and playing at a high level themselves as juniors.

"So having that mix now and passing that information and skills onto the junior group and still having that chance to make finals and potentially win again makes this season really exciting."

Building off of this buzz, the 2021/22 champions will once again steel themselves for another finals tilt, or at least their coach certainly hopes so.

"We always hope to win, we know we've got to get time into the junior ones as well, so a lot of development but we'd be disappointed if we didn't make finals," she said.

All the preseason hype will finally come to an end this Saturday at Korumburra Indoor Recreation Centre, in a blockbuster rivalry double header.

The women will tip things off at 6pm in a clash of the champions, before the men hit the floor as one of the best local sporting rivalries adds another chapter, both coaches had their say on their huge season openers.

"The boys have said this is one they really want, all eyes are on Korumburra for us, it's a really important one, the boys are focused, and I'll get them ready on the day, we'll be ready to play," Mortimore said.

"We're hoping to get out and run, we've got some speed, they're the reigning champions, they've got great juniors and women's sides historically, they'll be super tough, we're going in as underdogs," said Garnham.

"But we'll try our best and take it to them and hopefully come away with the win."

Just to build even more excitement, in 2023/24 it will be easier than ever to watch the Coasters CBL stars strut their stuff out on their home floor, with five massive home games, all on Sundays!

This is a move which was requested by WABA president Michael Bell and his team, as a way of making the CBL action more accessible to families and locals in the area, Michael spoke of this change to the Sentinel-Times last week.

"It's really the perfect substitute for senior footy, it's the highest level we have around the region and its so easy to get to, we really want to build that family atmosphere," he said.

Wonthaggi's huge home opener double header tips off with the women at 1.2pm this Sunday at the Bass Coast Community Stadium, with the men to follow at 2pm, both against Southern Peninsula.

Both incoming coaches threw their support behind the change to Sunday afternoon home dates.

"I think particularly for local junior basketball players in the area it's a really good opportunity to come and see kids that have come through the same club and got to a point where they perform," said Mortimore.

"We've got Jenson, Jett and Dom who are all really solid local juniors who are going to be competing in high levels of basketball for a long time, so I think for juniors to come and see how far they can get to as basketballers in Wonthaggi it's a really good opportunity to come and support."

"Come down because you can see some great local talent, some people they've potentially grown up with our know around the area and see some role models for men and women," said Garnham.

"It's great for those younger people to see that there is quality high-level sport in their region that they can be part of, either through playing or just by coming and watching and we want to do our town - Wonthaggi and surrounds proud."

The club is hungry for more success this summer as it continues to grow at all levels.

"Numbers for the club overall are great, domestic is still growing, we've had to move to adding a Friday night to the schedule to fit everything in, rep' is going well too, we just hosted heaps of practice games for the local clubs over the weekend," said Bell.

Overall, the WABA is set for another bumper season of basketball, and it promises to be an unmissable one for the area's locals, who are all welcome to come get their piece of the action.

PUBLIC NOTICES

CARING FOR SAM'S CHILDREN

Please support the fundraiser for Sam Fraser's children, to help cover the cost of their care and education. To donate, go to gofund.me/b6e777cb, or search gofundme.com for "Caring for Sams Children".

bass coast community foundation

Making a real difference in the lives of people across Bass Coast.

If you can give, please give where you live.

www.bccf.org.au

PUBLIC NOTICE

beach

Community Information Webinar

To continue meeting natural gas demand from homes, business and industry, Beach Energy has commenced planning and consultation for the Offshore Gas Victoria (OGV) Project.

The webinar will enable the local community to learn more about the OGV Project, which is considering a range of activity in the Commonwealth waters across several phases. These include seabed assessments (non-seismic), drilling and connecting new wells, and removing suspended wells.

We are committed to working with our local communities, ensuring people are informed of our projects and can provide feedback. Stakeholder consultation is an important part of our planning as it helps identify any local concerns and ensures management of potential impacts.

If you would like to ask our technical staff questions about our projects, or provide feedback, please register your interest in joining the webinar by emailing community@beachenergy.com.au.

Tuesday 17 October 2023 from 5pm to 6pm

We welcome your questions, please contact:

P 1800 797 011

E community@beachenergy.com.au

beachenergy.com.au

READ MORE

GD23 BM4

The Border Watch Notice for Relevant Persons

General Notices

Public Notices and Event

PUBLIC NOTICE

Continuing to meet Australia's gas needs

beach

Beach Energy supplies the Australian east-coast gas market through production at the Otway Gas Plant near Port Campbell and the Lang Lang Gas Plant 80km south-east of the Melbourne CBD. To continue meeting natural gas demand from homes, business and industry, Beach has commenced planning and consultation for the Offshore Gas Victoria (OGV) Project.

Activities and Timing

Subject to all required approvals, from early 2024, there will be several activities in offshore Commonwealth waters south of Port Campbell and in Bass Strait in existing production and exploration licenses held by Beach. Activities will involve different phases including seabed assessments (non-seismic), removing suspended wells, as well as drilling and connecting new wells to existing pipelines.

Environment Plans

The OGV Project will require Environment Plans to be accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) before commencement of activities.

Environment Plans must include a description of the existing environment and the proposed activities, an evaluation of the impacts and risks, environmental performance outcomes and controls, implementation strategy, and reporting requirements.

Consultation and feedback with Relevant Persons whose functions, interests or activities may be affected by the project activities is an important part of developing Environmental Plans.

Consultation

As an established operator, Beach has conducted transparent and respectful consultations with Commercial Fishers, First Nations groups, local communities and other Relevant Persons for many years.

If you think your functions, interests or activities may be affected we would like to consult with you understand your concerns and where possible, to explore measures to reduce any impacts and risks.

Relevant Persons may request that the information they provide not be published in the Environment Plan.

If there is someone you believe may be affected by the proposed activities, please ask them to contact us.

Further information

Project information sheets, activity location maps and further information on consultation can be accessed via our website or scanning the QR code below.

P 1800 797 011
E community@beachenergy.com.au
beachenergy.com.au/ogv

READ MORE

6023-0194

Employment

Positions Vacant

MAKING A DIFFERENCE SO SOUTH AUSTRALIA THRIVES

Government of South Australia

PROJECT OFFICER

Department for Environment and Water
Mount Gambier
Contract up to 2 years
Vacancy ID: 545838
$84,622 - $94,003 per annum (ASO5)

An exciting opportunity exists for a Project Officer in Water Licensing Branch. The Officer is responsible for management of specific programs and providing policy advice on water planning and management matters to industry representatives and customers. The position contributes to the development and implementation of agency objectives, programs and projects. Seeking a Project Officer to provide high level project management across water planning and management matters. The incumbent works with industry groups, water licence holders and the general public regarding complex water allocation and licensing matters. The role is the key contact for commercial forest licence holders and assists in regional and state-wide policy development and water compliance.

Head to I Work for SA to read the role description and follow the instructions to apply. Applications will only be accepted through I Work for SA.

Initial enquiries to:
Christine Fiebig, Manager, Customer Service & Regional Delivery, Christine.Fiebig@sa.gov.au or 0427 813 850.

To apply and for more information visit the I WORK FOR SA website: www.iworkforsa.gov.au and search by vacancy number.

Applications close:
11pm, Monday 4 September 2023

The Department for Environment and Water is committed to building a diverse and inclusive workplace. We encourage applications from people with diverse backgrounds including all ages and gender identities, Aboriginal and Torres Strait Islander, people with disability, culturally and linguistically diverse and LGBTIQA+.

The South Australian Public Sector promotes diversity and flexible ways of working including part time. Applicants are encouraged to discuss the flexible working arrangement for this role.

YM 9098

IWORKFOR.SA.gov.au

Public Notices and Event

CONTRACT NO. 2023-24-24
Local Freight Roads Projects Portland Heathfield Linsday Road Rehabilitation & Widening
Full details found at: www.tenderlink.com/glenelg/
Closing Date: 28/09/2023 at 3pm.
LATE TENDERS WILL NOT BE CONSIDERED

CONTRACT NO. 2023-24-25
Local Freight Roads Projects Portland Fitzgerald Street Upgrade
Full details found at: www.tenderlink.com/glenelg/
Closing Date: 28/09/2023 at 3pm.
LATE TENDERS WILL NOT BE CONSIDERED

Need cash?
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1300 666 808

Employment

Positions Vacant

Wattle Range

COMMUNITY DEVELOPMENT OFFICER

Wattle Range Council is seeking a suitably qualified applicant to join our organisation in a full-time Community Development Officer role.

The Community Development Officer is responsible for planning, developing, coordinating, implementing, and evaluating a range of community/social initiatives. These initiatives include but are not limited to, projects and events involving seniors, suicide prevention, people with a disability, early childhood, families, youth, community safety and volunteering. The position will work collaboratively with key agencies to develop sustainable partnerships.

For further information about the role and how to apply, visit Council's website at **www.wattlerange.sa.gov.au/employment** or contact Council's Human Resources Team on (08) 8733 0900.

Applications close **9am on Monday, 4 September 2023.**

Positions Vacant

Tourism & Events Coordinator

Wattle Range Council is seeking a suitably qualified applicant to join our organisation in a part-time Tourism & Events Coordinator role.

The Tourism & Events Coordinator works collaboratively with the Manager of Community Development in managing Council's Visitor Information Centres and promoting and organising tourism events in the Wattle Range Council region.

For further information about the role and how to apply, visit Council's website at www.wattlerange.sa.gov.au/employment or contact Council's Human Resources Team on (08) 8733 0900.

Applications close 9 am on Monday, 11 September 2023.

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CALL: **1300 666 808**

National Indigenous Times notice of Relevant Persons

PUBLIC NOTICE

beach

Sea Country Consultation

Beach Energy is inviting consultation with First Nations Peoples who may have an interest in Sea Country in Beach's offshore project areas. Beach supplies the Australian east-coast gas market through production at the Otway Gas Plant near Port Campbell and the Lang Lang Gas Plant 80km south-east of the Melbourne CBD.

As Australia continues its transition to more renewable energy sources there is still demand for natural gas from homes, business and industry. To continue meeting this need, Beach has commenced planning and consultation for its Offshore Gas Victoria (OGV) Project.

Activities and Timing
Activities will occur in existing production and exploration licenses held by Beach and will include seabed assessments (non-seismic), removing suspended wells, drilling and connecting new wells to existing pipelines. Startinwg from early 2024, activities will be run over different phases through to late 2026. The project and all timings are subject to final internal and regulatory approvals, vessel availability and weather conditions. There are several locations south of Port Campbell and in Bass Strait, as shown on the project maps (see QR code below).

Environment Plans
The OGV Project will require Environment Plans to be approved by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) before activities can start.

Environment Plans must include:

- a description of the proposed activities
- a description of the natural environment including the social, economic and cultural features
- evaluation of the impacts and risks
- any measures to reduce impacts and risks that were identified during consultation
- environmental performance outcomes and controls
- implementation strategy and reporting requirements
- a description of how consultation was carried out with relevant persons whose functions, interests and activities may be affected by the project activities.

An important part of developing an Environmental Plan is consulting and obtaining feedback from people with a cultural connection to Sea Country through Indigenous tradition.

Consultation
Beach aims to conduct transparent and respectful consultations with First Nations groups, and other relevant persons.

If you consider your functions, interests or activities may be affected we would like to consult with you to understand your concerns and where possible, to explore measures to reduce any impacts and risks.

We are required to share consultation records with NOPSEMA, however you can tell us if any cultural information that you share with us is sensitive and it won't be published in the Environment Plan.

If you know of other community members who may be interested or affected by the proposed activities, please ask them to contact us via wwour dedicated First Nations Engagement Manager, Candice on community@beachenergy.com.au

Further Information
Project information sheets, activity location maps and further information on consultation can be accessed via the QR code below.

P 1800 797 011
E community@beachenergy.com.au
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READ MORE

0023-501 4

Dad hopes for some good from girl's death

DECHLAN BRENNAN

The father of a young Indigenous girl who died in hospital in 2019 while in out-of-home care said he hopes the changes recommended by the Coroner will prevent "other children from experiencing" what his daughter did.

Sasha (not her real name), who was on the autism spectrum, was 12 when she died at The Royal Children's Hospital in Melbourne on August 2, 2019.

Earlier this month Coroner Paul Lawrie stated she died from complications resulting from pneumonia and heart valve infection in the setting of a heart abnormality that Sasha had.

Between July 12 and July 28, when she was admitted to Sale hospital in Gippsland — Sasha visited a GP three times; each doctor diagnosing her as having a viral illness.

She was transferred to RCH but despite emergency heart surgery she died on August 2.

Her father, a proud Palawa man, was born with congenital valvular heart disease and in 2009 had surgery to replace his aortic valve.

He told the coronial inquiry that no one from the Department of Families, Fairness and Housing or the hospital asked him about his medical history.

Despite Sasha's mother telling the inquiry that she had passed on this information; in his findings, the Coroner stated: "(He) cannot be satisfied that the information that Sasha's father had 'heart issues' was effectively communicated within the conversation."

The Coroner did find that the relaying of critical medical information about Sasha was at points delayed, and not communicated effectively.

The Victorian Aboriginal Legal Service represented Sasha's father during the inquest.

VALS chief executive, Yorta Yorta and Narrandjeri woman Nerita Waight, told National Indigenous Times Sasha's tragic death highlighted easily addressable gaps in the State's child protection and healthcare systems.

"VALS wants the Victorian Government to collaborate with the Aboriginal community and organisations to improve the health and child protection systems that failed Sasha," she said.

"The child protection system has a responsibility to be as informed as possible about the medical history of a child in care."

In a statement, Sasha's father said he missed his daughter who "was so bubbly and full of life".

"We were a big part of each other's lives and always shared a special bond," he said.

The Coroner made several recommendations to better improve communication between the child protection and healthcare systems.

These include that the Department of Families, Fairness and Housing reviews its child protection manual and other relevant policies to include guidance to child protection practitioners to seek familial medical history that may impact the health of a child in its care; the Department of Families, Fairness and Housing should implement effective urgent communication with its case-contracting agencies, supported by policy and procedures, in respect of a child in care; the means adopted should be available at all hours and capable of actively alerting the recipient and the department should review its child protection manual and other relevant policies or guidelines to make clear to case-contracting agencies the circumstances in which it expects to urgently receive information concerning a child in care.

Sasha's father said he hoped these changes would help others.

"One of the recommendations (from the Coroner) was about improving processes in the child protection system so that case workers try to gather important medical information like a child's family medical history," he said.

Ms Waight agreed.

"VALS supports the Coroner's recommendation that the DFFH review its policies to make sure that practitioners try to seek a child's family medical history," she said.

"A nine-hour delay of Sasha's critical pathology results is unacceptable. VALS strongly supports the Coroner's recommendation to improve communication of critical clinical information at Central Gippsland Health Service and in all Victorian health services in Victoria.

"VALS is proud of the hard work and courage of Sasha's father throughout the Coronial inquest. We would like to see all recommendations implemented so that all Aboriginal children in care are better managed and looked after when hospitalised."

Sasha's father said that while the changes were welcome, they had come too late for his daughter.

"It brings me some closure to know that they're starting to try to make changes to fix gaps in the system and that it's because of Sasha that these improvements will happen. But at the same time, I wish that Sasha had the opportunity to have the benefit of these changes," he said.

"I hope that the changes prevent other children from experiencing what Sasha experienced."

Koori Mail Notice for Relevant Persons

PUBLIC NOTICE

beach

Sea Country Consultation

Beach Energy is inviting consultation with First Nations Peoples who may have an interest in Sea Country in Beach's offshore project areas. Beach supplies the Australian east-coast gas market through production at the Otway Gas Plant near Port Campbell and the Lang Lang Gas Plant 80km south-east of the Melbourne CBD.

As Australia continues its transition to more renewable energy sources there is still demand for natural gas from homes, business and industry. To continue meeting this need, Beach has commenced planning and consultation for its Offshore Gas Victoria (OGV) Project.

Activities and Timing
Activities will occur in existing production and exploration licenses held by Beach and will include seabed assessments (non-seismic), removing suspended wells, drilling and connecting new wells to existing pipelines. Starting from early 2024, activities will be run over different phases through to late 2026. The project and all timings are subject to final internal and regulatory approvals, vessel availability and weather conditions. There are several locations south of Port Campbell and in Bass Strait, as shown on the project maps (see QR code below).

Environment Plans
The OGV Project will require Environment Plans to be approved by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) before activities can start.

Environment Plans must include:

- a description of the proposed activities
- a description of the natural environment including the social, economic and cultural features
- evaluation of the impacts and risks
- any measures to reduce impacts and risks that were identified during consultation
- environmental performance outcomes and controls
- implementation strategy and reporting requirements
- a description of how consultation was carried out with relevant persons whose functions, interests and activities may be affected by the project activities.

An important part of developing an Environmental Plan is consulting and obtaining feedback from people with a cultural connection to Sea Country through Indigenous tradition.

Consultation
Beach aims to conduct transparent and respectful consultations with First Nations groups, and other relevant persons.

If you consider your functions, interests or activities may be affected we would like to consult with you to understand your concerns and where possible, to explore measures to reduce any impacts and risks.

We are required to share consultation records with NOPSEMA, however you can tell us if any cultural information that you share with us is sensitive and it won't be published in the Environment Plan.

If you know of other community members who may be interested or affected by the proposed activities, please ask them to contact us via our dedicated First Nations Engagement Manager, Candice on community@beachenergy.com.au

Further Information
Project information sheets, activity location maps and further information on consultation can be accessed via the QR code below.

P 1800 797 011
E community@beachenergy.com.au
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GD23-0214

PUBLIC NOTICE

DHUDHUROA, WAYWURRU AND NGURAI ILLUM NATIVE TITLE AUTHORISATION MEETING

21 October 2023, Novotel Melbourne Preston

Background
Massar Briggs Law is convening a meeting for all Aboriginal People who assert native title rights and interests in the area of land and waters depicted in the **map below (Proposed Claim Area)**. The meeting is being convened to discuss and authorise the making of a joint Native Title Determination Application for the Dhudhuroa, Waywurru and Ngurai illum People over the area depicted in the Proposed Claim Area.

THIS NOTICE INVITES all Aboriginal People who assert native title rights and interests in the Proposed Claim Area to attend a meeting to authorise a Native Title Determination Application, being the descendants of the following apical ancestors **(Proposed Native Title Claim Group)**:

1. Charles Tattambo (c. 1790 – 1868), grandfather of Lizzy Davis nee Murchison/Eylett (b.1857-60-d.1957), Hughie Anderson (c.1844-56 – d.1928)
2. Nelson also known as Tro-Bullock (active 1840s) (married to Nora also known as Wannanee, parents of John Terrick)
3. Tootlerrie
4. Lydia Briggs (nee Beaton, nee Edmunds) (c.1851 – 1885)
5. King Brangy Brangy/Bangy/Bangnui/Brankey (early 1800s), father of Kate Brangy (c. 1856 – 1918), Edith also known as Ada Brangy (c. 1866 – 1904) and Amelia Brangy (d. 1973)
6. Mary Ann Brewer (nee Barbour) (c. 1844 – 1910)
7. Maggie Nelson, nee Stone alias McDonald, and her grandfather King Billy Bengeist
8. John Pierce Jr (c. 1839-41 – 1877)
9. Mary (early 1800s), mother of Mary Jane Andrew (c.1856 – 1945)
10. Jinny Cooper (Jillibino) also known as Jenny Mutton also known as Jane Cooper (c. 1828-1838 – 1884)
11. Jane Lee
12. Maggie Simms (died 1878)

Any person who is or may be a Descendant/member of the Proposed Native Title Claim Group should attend whether or not they have an ancestor listed above. For any queries or further information, please do not hesitate to contact Tara Rosenberg at Massar Briggs Law on 03 9653 9040 or tara@massarbriggslaw.com.au.

Information Session:
WHEN: 21 October 2023
WHERE: Novotel Melbourne Preston, 215 Bell Street, Preston VIC 3072, Australia
TIME: 9:00am – 12:00pm

AUTHORISATION MEETING
WHEN: 21 October 2023
WHERE: Novotel Melbourne Preston, 215 Bell Street, Preston VIC 3072, Australia
TIME: 1:30pm – 4:30pm

Purpose
The purpose of the Authorisation Meeting is to authorise a Dhudhuroa, Waywurru and Ngurai illum Native Title Claim.

Decisions to make at this meeting include:
- What decision-making process to use to authorise the claim
- Agreeing on key details of the native title claim
- Choosing and authorising the Applicant for the claim, and putting conditions on their authority
- Anything else raised at the meeting about a native title claim over the proposed claim area.

Proxies
Those people who are and may be eligible to attend but are unable to do so may request a proxy voting form from Massar Briggs Law.

Attending the Meeting
The Authorisation Meeting will be held in person at the Novotel Melbourne Preston. If you wish to attend the meeting, please contact Tara Rosenberg at Massar Briggs Law on 03 9653 9040 or tara@massarbriggslaw.com.au by no later than **5pm on Friday 13 October 2023**.

For those attending the meeting, accommodation assistance may be available. Please contact Massar Briggs Law (details above) for accommodation assistance no later than 5pm on Friday 13 October 2023. Please note that if you do not contact Massar Briggs Law by Friday 13 October 2023, Massar Briggs Law cannot guarantee we will be able to assist with accommodation arrangements – although you would still be more than welcome to attend the meeting.

Morning tea, lunch, and afternoon tea will be provided at the venue.

Bairnsdale Advertiser Notice of Webinar

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Community Information Webinar

To continue meeting natural gas demand from homes, business and industry, Beach Energy has commenced planning and consultation for the Offshore Gas Victoria (OGV) Project.

The webinar will enable the local community to learn more about the OGV Project, which is considering a range of activity in the Commonwealth waters across several phases. These include seabed assessments (non-seismic), drilling and connecting new wells, and removing suspended wells.

We are committed to working with our local communities, ensuring people are informed of our projects and can provide feedback. Stakeholder consultation is an important part of our planning as it helps identify any local concerns and ensures management of potential impacts.

If you would like to ask our technical staff questions about our projects, or provide feedback, please register your interest in joining the webinar by emailing community@beachenergy.com.au.

Tuesday 17 October 2023 from 5pm to 6pm

We welcome your questions, please contact:

P 1800 797 011
E community@beachenergy.com.au
beachenergy.com.au

READ MORE

PUBLIC NOTICES

Expressions of Interest for appointment to the

EAST GIPPSLAND RAIL TRAIL COMMITTEE OF MANAGEMENT

Do you want to be involved in caring for, protecting and developing your local rail trail? Do you have skills in marketing and tourism, administration, conservation and facilities management, or business and financial management?

The Department of Energy, Environment and Climate Action (DEECA), is seeking expressions of interest from people willing to nominate for a three-year appointment to the East Gippsland Rail Trail Committee of Management

The volunteers who are appointed to the committee will be responsible for overseeing the management, protection and development of the rail trail on behalf of the East Gippsland community

Expression of Interest forms and further information on the roles and responsibilities of the Committee of Management are available from **Tracey West, tracey.west@delwp.vic.gov.au** or call **0457 501 299**

Expressions of Interest can be emailed, mailed or lodged at the **Bairnsdale DEECA Office** at **574 Main Street, Bairnsdale 3875 by 5:00 pm on Wednesday 18 October 2023**

VICTORIA State Government

PUBLIC NOTICES

FIRST AID COURSES
CPR: 9am - 12pm
Level 2: 9am - 5pm
Thursday, October 19, 2023.
Thursday, November 16, 2023.

BOAT LICENCE COURSES
Wednesday, October 18, 2023.
Wednesday, November 15, 2023.
6pm - 10pm
Paynesville Neighbourhood Centre
55 The Esplanade, Paynesville
To book, phone 9894 1013
First Aid Management & Training Centre
www.firstaidmanagement.com.au

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PUBLIC NOTICES

HUGE FABRIC & CRAFT SUPPLIES SALE
Sunday, October 15th, 2023
9am - 2pm
Bundalaguah Hall
Maffra - Sale Road

Mallacoota District Health & Support Service

Mallacoota District Health and Support Service Inc.
Notice of Annual General Meeting 2023
Thursday, October 19, 2023
9am
The Annual General Meeting will be held in the Genoa Hall, Princess Highway Genoa Road & Mattsson Street. Members are invited to attend. Morning tea will be provided.

BAIRNSDALE RACING CLUB INC.

BAIRNSDALE RACING CLUB

Calling for nominations for four (4) positions for Committee. Term is three years.

Please contact Club Manager on 0429 952 827 or email bairnsdale@countryracing.com.au for nomination forms.

The Bairnsdale Parkinson's Peer Support Group
meets the 2nd Friday of the month in Bairnsdale

All people living with Parkinson's are welcome.

For further information please contact Ian on 0421 141 858 or Darla on 0421 341 825

Lindenow & District Pre-School
has vacancies for 2024 in our
FREE Funded 3 year old kindergarten program.
Our 2024 sessions will operate every Thursday and Friday 9am-3pm per term.
If you would like to enquire about enrolling your child, please contact the kindergarten on 51 571458
OR email lindenow.kin@kindergarten.vic.gov.au

Build Your Trade in our Trades Directory.

Phone 5150 2300

SITUATIONS VACANT

ENSAY BUSH NURSING CENTRE

Bush Nurse
Bush Nursing Service
(Re-Advertised)

Position: Centre Manager/NurseManager
Classification: Registered Nurse Division One, Nurse Manager Classification
Reports to: Committee of Management (COM)
Hours of Duty: Per Contract Hours (Typically 35 Hours a Week), permanent, ongoing.
Or
70 hours a month in a job share capacity as Permanent part - time.
Award & Conditions: Nurses and Midwives (Victorian Public Sector) Enterprise Agreement 2020-2024

Ensay Bush Nursing Centre is seeking services of a Registered Nurse Division One, to undertake the role as Centre (Nurse) Manager in a full-time capacity per agreed contract hours, candidates may also opt to take the role on as a job share arrangement of 70 hours a month.

The Bush Nurse Manager plays a crucial role in our growing and diverse community providing both vital and appropriate health services.

A commencement date of 6th November 2023 is desirable, but not mandatory, to allow for a 4-week orientation period, delivered by the incumbent centre manager.

The position entails the role of Bush Nurse predominantly working as a sole practitioner attending to community needs including the response to emergency incidents and the undertaking of management / administrative responsibilities, including but not limited to reporting, human resource management, budgeting and attending meetings.

Essential Criteria:
- Current Registration with AHPRA
- Current driver's licence
- Demonstrated ability to work independently
- Minimum 3 years post graduate experience, must include some emergency or acute nursing experience
- Proven clinical and assessment skills
- Must be prepared to undertake and complete the Victorian Remote Area Nurse training delivered by Ambulance Victoria. Successful completion of this training is a mandatory requirement to work at Ensay Bush Nursing Centre.
- Advanced Life Support through a recognised training organisation

Desirable Criteria:
- Nurse Immuniser or prepared to work towards.
- Rural and isolated endorsed practice nurse would be well regarded but not essential
- Management experience

If you are looking for a community to care for based in a dedicated Bush Nursing Centre, Ensay Bush Nursing Centre is interested in hearing from you.

Position descriptions and application requirements can be obtained from either:
Therese Burke ph. 03 5150 2614 or
Email: therese.burke@gha.net.au
Or
Jane Lloyd ph. 0400. 932 624
Email: lloyd.jane.h@gmail.com

Applications including a current curriculum vitae should be marked "Private and Confidential" and forwarded to:

President Ensay Bush Nursing Centre
Jane Lloyd
P.O Box
Ensay, Vic., 3895.

Or via email: lloyd.jane.h@gmail.com

Closing date: 6th October 2023

The Advocate Notice for Relevant Persons

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The Advocate

Phone: 1300 363 789
Email: classifieds@theadvocate.com.au

The Advocate

CONTACT US

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Public Notices

Bagdad Uniting Cemetery Ownership Change

From 18.08.23 the cemetery at 2 Chauncy Vale Rd, Bagdad, 7030 is managed by Ellen Jones.
Open to the public during daylight hours.
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Public Notices

Dog Control Act 2000 Section 51 (3) (a) (b)

NOTICE OF INTENTION TO APPLY FOR A LICENCE

Notice is hereby given that it is my intention to apply to the Central Coast Council for a licence to keep 4 dogs, 3 German Short Haired Pointers ,1 Patterdale Terrier at my premises situated at 2 Cheryl Court, west Ulverstone, Tas 7315. Persons residing within 200 metres of the boundary of the above premises, may within 14 days after the publication of this notice object in writing to the Registrar of Dogs of the above Council stating their reasons of objection to the grant of the licence.

Positions Vacant

Penguin Guiding
Volunteers needed in Burnie, Ulitico and Stanley.
Training Day Saturday 16 September, 2023
If you are interested, contact Evelyn **0437 149 747** for more information.

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NEW 25 yo good service. Everything, naughty. Burnie, 0450 378 885.

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Public Notices

PUBLIC NOTICE

Continuing to meet Australia's gas needs

beach

Beach Energy supplies the Australian east-coast gas market through production at the Otway Gas Plant near Port Campbell and the Lang Lang Gas Plant 80km south-east of the Melbourne CBD. To continue meeting natural gas demand from homes, business and industry, Beach has commenced planning and consultation for the Offshore Gas Victoria (OGV) Project.

Activities and Timing

Subject to all required approvals, from early 2024, there will be several activities in offshore Commonwealth waters south of Port Campbell and in Bass Strait in existing production and exploration licenses held by Beach. Activities will involve different phases including seabed assessments (non-seismic), removing suspended wells, as well as drilling and connecting new wells to existing pipelines.

Environment Plans

The OGV Project will require Environment Plans to be accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) before commencement of activities.

Environment Plans must include a description of the existing environment and the proposed activities, an evaluation of the impacts and risks, environmental performance outcomes and controls, implementation strategy, and reporting requirements.

Consultation and feedback with Relevant Persons whose functions, interests or activities may be affected by the project activities is an important part of developing Environmental Plans.

Consultation

As an established operator, Beach has conducted transparent and respectful consultations with Commercial Fishers, First Nations groups, local communities and other Relevant Persons for many years.

If you think your functions, interests or activities may be affected we would like to consult with you understand your concerns and where possible, to explore measures to reduce any impacts and risks.

Relevant Persons may request that the information they provide not be published in the Environment Plan.

If there is someone you believe may be affected by the proposed activities, please ask them to contact us.

Further information

Project information sheets, activity location maps and further information on consultation can be accessed via our website or scanning the QR code below.

P 1800 797 011
E community@beachenergy.com.au
beachenergy.com.au/ogv

READ MORE

G003 DIV4

Death Notices

PINNER
Christopher
28/02/1933 - 28/08/2023

Loved and respected brother-In-law of Robbie and Margaret Burns and uncle to Tony, Christine and Mark (dec).

Our sincere condolences to Laxie and family.

We hope they have a warm one up there in the shed for you "Pal"

Rest In Peace

PINNER
Christopher

Brother-In-law of Rance and uncle of Lisa, Tina and Rodney.

Sincere condolences to Laxie and family.

Sleep peacefully. God Bless.

Funeral Notices

PINNER
(Chris)
Christopher

Family and friends of Mr Christopher Pinner, are warmly invited to attend his funeral service to be held at, **Mersey Gardens Chapel and Crematorium**, 20-24 Stony Rise Road, Devonport on MONDAY, 4th September, 2023 at 1:30 p.m.
For those unable to attend, we encourage you to use our livestreaming service available at, pinegrovefunerals.com.au

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King Island Courier Notice of Community Meeting

Farm safety journey success

A FOUNDER of the Safe Farming Program Phillip John is leaving the organisation on September 21.

Mr John is well known to King Island farmers and regularly visited the island with his Safe Farming Program partner Stu Beams.

The Safe Farming Tasmania program is a joint initiative of WorkSafe Tasmania and the Department of Natural Resources and Environment. The Program is supported by an industry-led stakeholder reference group including Primary Employers Tasmania and has gained national and international attention.

Mr John grew up in the North West rural community of South Riana; he worked practically for many years in both the rural and forestry sectors prior to moving into Health and Safety and was known to King Islanders prior to the establishment of the Safe Farming program in due to his Work Health and Safety inspections and training workshops.

"Looking back on my journey with Safe Farming, I vividly recall the moment when our former agriculture minister Jeremy Rockliff, approached me at Agfest in May 2015.

"He challenged us to transform the culture of the agricultural sector - to shift it from one where farm safety had long been sidelined, deemed too difficult to tackle, to one where safety is not only acknowledged but embraced.

"We embarked on this journey together, and I firmly believe that thanks to our incredible supporters, acceptance and trust in Safe Farming, we have undoubtedly achieved the latter.

"Now, as we enter the eighth year of a program that was initially planned for three, I am confident that farm safety has become a serious and integral part of most farmers' daily routines.

"It is heartening to see that getting farm safety right is no longer a pipe dream but a recognized and attainable goal, particularly when leveraging the measured and professional assistance and guidance that Safe Farming provides. This positive momentum will undoubtedly persist.

"In collaboration with all of you, I believe we've created something truly special and unique. We have had a lasting and positive impact on farmers and farming communities across our state, including King, Flinders, and Cape Barron Islands. Moreover, our influence extends beyond our borders, as we inspire and educate colleagues from both interstate and overseas. Most significantly, Safe Farming is now a name trusted and respected by the majority of our farmers and farming communities.

"I want to express my heartfelt gratitude for the support, dedication, and unwavering commitment each of you has shown to Safe Farming. It has been an honour and a privilege to work alongside such a remarkable group of individuals. While my journey with Safe Farming may be coming to a close, I am confident that the legacy we've built together will endure and continue to make a positive impact on farm safety," Mr John said.

Dairy farmer Kelly Lancaster with Safe Farming advisor Phil John at Pegarah

PUBLIC NOTICE

beach

Community Information Meeting

To continue meeting natural gas demand from homes, business and industry, Beach Energy has commenced planning and consultation for the Offshore Gas Victoria (OGV) Project.

The community meeting will enable the local community to learn more about the OGV Project which is considering a range of activity in Commonwealth waters across several phases. These include seabed assessments (non-seismic), drilling and connecting new wells, and removing suspended wells.

We are committed to working with our local communities, ensuring people are informed of our projects and can provide feedback. Stakeholder consultation is an important part of our planning as it helps identify any local concerns and ensures management of potential impacts.

Our technical staff will be available from 4 pm for anyone wishing to drop in to ask questions about our projects, or to provide feedback.

Thursday 21 September, 2023 6.00 PM to 7.30 PM
Currie Town Hall, 10 George Street, Currie, King Island 7256

We welcome your questions, please contact:

P 1800 797 011
E community@beachenergy.com.au

For further project information use the QR code or visit beachenergy.com.au/ogv/

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King Island Courier
A Beacon for the Community

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Woodfired Pizza on Friday Night
for reservations call:
Corey - 0437 666 138 Sarah - 0428 133 319

he Beacon newsletter notice of community session

PUBLIC NOTICE

beach

Community Information Sessions

To continue meeting natural gas demand from homes, business and industry, Beach Energy has commenced planning and consultation for the Offshore Gas Victoria (OGV) Project.

The drop-in session will enable the local community to learn more about upcoming Beach projects:

- The OGV Project which is considering a range of activity in Commonwealth waters across several phases. These include seabed assessments (non-seismic), drilling and connecting new wells, and removing suspended wells.
- The Calico Survey (3D transitional zone seismic survey) which will be conducted between Nirranda South to the west and approximately 6km east of Port Campbell, out to 3 nautical miles offshore and approximately 4km inland.

We are committed to working with our local communities, ensuring people are informed of our projects and can provide feedback. Stakeholder consultation is an important part of our planning as it helps identify any local concerns and ensures management of potential impacts.

Please drop in any time at one of our information sessions below if you would like to ask our technical staff questions about our projects, or to provide feedback.

Monday 24 July, 2023 2.00 PM to 7.00 PM
Port Campbell Surf Life Saving Club,
1 Cairns Street, Port Campbell

We welcome your questions, please contact:

P 1800 797 011
E community@beachenergy.com.au
beachenergy.com.au/ogv/

READ MORE

6023 0146

Warrnambool Standard public notice of webinars

Public Notices

PUBLIC NOTICE

beach

Community Information Webinars

To continue meeting natural gas demand from homes, business and industry, Beach Energy has commenced planning and consultation for the Offshore Gas Victoria (OGV) Project.

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We are committed to working with our local communities, ensuring people are informed of our projects and can provide feedback. Stakeholder consultation is an important part of our planning as it helps identify any local concerns and ensures management of potential impacts.

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Wednesday 22 November 2023, 5pm to 6pm AEDT
Drilling and Plug and Abandonment activities explained, including Q & A

Wednesday 29 November 2023, 12pm to 12.30pm AEDT
Drilling Q & A with Beach technical team

Thursday 30 November 2023, 1.30pm – 2pm AEDT
Plug and Abandonment Q & A with Beach technical team

We welcome your questions, please contact:

P 1800 797 011
E community@beachenergy.com.au
engage.beachenergy.com.au/

READ MORE

GD23-0274

Public Notices

VICTORIA State Government

Member vacancies - Victorian Class B cemetery trusts

Are you interested in making a meaningful contribution to your community, learning new skills and preserving local history for future generations?

The following Class B cemetery trusts are seeking volunteer trust members. In this role you will gain hands-on experience in managing a public cemetery and valuable governance skills as a member of a public board. Free governance training is provided.

THE ELLERSLIE CEMETERY TRUST
THE WARRNAMBOOL CEMETERY TRUST

Who should apply?

Applications are welcome from community members with a range of skills and experiences including administration, committees, and groundskeeping. Women and people from diverse backgrounds are actively encouraged to seek appointment. Current trust members whose terms of appointment are due to expire are welcome to apply for reappointment.

What it means to be a Victorian cemetery trust member

Cemetery trust members are appointed by the Governor in Council for a term of up to five years on the recommendation of the Minister for Health. Cemetery trusts are responsible for the management of public cemeteries, including planning for future cemetery services for their communities. More information about the role is available at <https://www.health.vic.gov.au/cemeteries-and-crematoria/class-b-cemetery-trust-appointments>.

How to register your interest

Please refer to the trust contact details below and contact the applicable trust within two weeks of the date of this advertisement:

Victorian Class B cemetery trust	Contact details
The Ellerslie Cemetery Trust	5599 6227
The Warrnambool Cemetery Trust	0447 838 747

The Victorian Government is committed to ensuring that government boards and committees reflect the rich diversity of the Victorian community. We encourage applications from people of all ages, Aboriginal people, people with disability, people from culturally and linguistically diverse backgrounds and from lesbian, gay, bisexual, trans, gender diverse, intersex and queer people. The trust will provide adjustments to the recruitment process upon request.

F49128

No time to phone? SUBMIT YOUR CLASSIFIED ONLINE! www.addirect.com.au

Public Notices

Shoe Repairs
Beat the Christmas Rush
24 Hour Service
RAUERTS shoex
92 Fairy Street
5562 3149
VH4841863

SAVE TIME, SUBMIT ONLINE
By placing your classified ad through our self-service portal,
addirect.com.au
• Submit your ad at any time of the day
• Access the portal from anywhere in Australia
• Place an ad into newspaper, website and mobile with three easy steps
Connect with Classifieds

WARRNAMBOOL CITY COUNCIL

Noticeboard

November 18, 2023

Have your say

Council's 2024-2025 Budget

Council is inviting the community to help shape the 2024-2025 Budget and review the Council Plan.

You can have your say online at **www.yoursaywarrnambool.com.au** or post a written submission to Council Budget, Warrnambool City Council, PO Box 198, Warrnambool 3280.

You can also provide feedback in person at a drop-in session to be held at the Civic Centre, 25 Liebig Street Warrnambool, on Wednesday 29 November from 6pm to 8pm.

New Vision For Flagstaff Hill

Council has released a draft new vision for Flagstaff Hill and is inviting the community to review and respond to this proposal.

You can read the new plan, Flagstaff Hill Re-Imagined: Vision and Opportunities Plan, and have your say at **www.yoursaywarrnambool.com.au**

Submissions close **Tuesday 21 November 2023.** Printed copies of the plan are also available at the Civic Centre, 25 Liebig Street Warrnambool.

Public Notice

Key Worker & Affordable Housing Proposal

Expression of Interest - Community Housing Agency
Council seeks to extend an invitation for Expression of Interest from a Community Housing Agency to activate and deliver a key worker accommodation and affordable housing project.

Submission close 5pm, Friday 15 December 2023. For further information email contact@warrnambool.vic.gov.au

The EOI document is available online at **www.warrnambool.vic.com.au**

Clearing Sale – South West Victorian Livestock Exchange

Council will hold a second clearing sale of the decommissioned South West Victorian Livestock Exchange. Items up for sale by auction include gates, rails, timber, rubber matting, steel shelving and other miscellaneous items.

The online auction, hosted by Nutrien Ag Solutions via AuctionsPlus (**www.auctionsplus.com.au**), will start 7am, Monday 27 November and close at 7pm, Monday 4 December 2023.

Items can be viewed at the former livestock exchange site in Caramut Road from 20 – 24 November, between 9am and 3pm. For further information contact Nutrien Ag Solutions Warrnambool Kieran Johnstone on 0408 352 629, or Anthony Mulraney on 0401 832 625.

Tenders

Saleyards Grazing Land

Register No. 20240123

Submission are invited for expressions of interest for the leasing of grazing land opposite the saleyards site (Rooneys Road side). Enquiries directed to Terry O'Sullivan on 0417 338 162. **Submissions close 2pm, Friday 1 December 2023.**

Brierly Recreation Reserve Eastern Oval Redevelopment – Electrical & Lighting Construction

Register No. 2024016

Submissions are invited for suitably qualified and experienced contractors in relation to the Brierly Recreation Reserve Eastern Oval Redevelopment – Electrical & Lighting Construction. Enquiries directed to Shaun Lucas on (03) 5559 4439. **Submissions close 2pm Friday 15 December 2023.**

Specification documents available online at **https://app.eprocure.com.au/warrnambool**
All submissions must be lodged electronically, via eProcure only.

Works and road closures

Liebig Street Pedestrian Crossing

(between Lava Street & Koroit Street)
Works: Paving maintenance.
Duration: Week commencing Monday 20 November 2023 for 1 week.
Impact: Sections of the road will be closed to vehicular traffic. Motorists and pedestrians are advised to observe all signage.
Contact: Don Allen, Construction Engineer on 0419 389 638.

Get Involved

Citizen of the Year Award Nominations Open!

Let's recognise our great Warrnambool citizens. Nominations for the 2024 Warrnambool Citizen of the Year Awards are now open.

Categories include Citizen of the Year, Young Citizen of the Year (aged 16-30), Community Event of the Year and Local Achiever.

To make a nomination visit **www.yoursaywarrnambool.com.au**

Nominations close Wednesday 22 November 2023. Hard copy nomination forms are also available at the Civic Centre, 25 Liebig Street Warrnambool.

www.warrnambool.vic.gov.au | contact@warrnambool.vic.gov.au | 5559 4800

Colac Herald Public

POSITIONS VACANT

SWAYN McCABE
CLAAS Harvest Centre CLAAS

NOW HIRING

SPARE PARTS

We're looking for a trainee or experienced person for a full time role to join the Colac team in the spare parts department.

Requirements:

- Great customer service skills and problem solving skills
- Computer skills
- Driver licence
- Ability to take counter and phone sales
- Stock control & pricing
- Workshop inquiries
- Stock control & pricing
- On-the-job training provided and great career opportunities

Be part of a successful, long-established local business in a dynamic opportunity for career growth in the agricultural sector.

Visit Us Online
Contact Us
5231 5322

REACH AN AUDIENCE IN OUR CLASSIFIEDS

ADVERTISE YOUR POSITIONS WITH US

Join our team

CORANGAMITE SHIRE

Administration Coordinator Planning

- An exciting opportunity to join our planning team in a 12-month fixed-term role
- Excellent benefits including a 19-day month
- Competitive salary, $70,666 - $78,534 based on qualifications and experience
- Based in Camperdown

This role is responsible for the effective and efficient coordination of the planning departments administration function. This includes assisting the Manager Planning and Building with a variety of tasks across several different planning functions.

Applications close 5 pm, Sunday 13 August.

Environmental Health Officer

- Permanent full-time, based in Camperdown
- Salary range $81,696 - $100,241 based on qualifications and experience
- Excellent benefits including a 19-day month
- Applications welcomed from both qualified and unqualified candidates with transferable skills

The Environmental Health Officer will be responsible for delivering Council's environmental health, including customer service, community education, statutory compliance and the research and production of innovative and effective policies, management plans and strategies.

If you're seeking a career change and have transferrable skills, get in touch. Corangamite Shire can fully fund training to become an Environmental Health Officer for the right applicant.

Applications close 5 pm, Sunday 13 August.

Apply online: corangamite.vic.gov.au/employment

corangamite.vic.gov.au

WEBBER & CHIVELL FERTILISERS

29 COWLEYS ROAD
COBDEN, VIC 3266
Ph: 03 5594 6294
Fax: 03 5594 6321
ABN: 73 062 446 217

Positions Vacant

Webber and Chivell are seeking highly skilled operators to become part of a great team that prides itself on a professional and quality service to our clients.

This is a great opportunity to join an open and friendly work environment leading the way with the modern machinery and new technologies.

- The successful applicants would have to be self motivated and able to work with or without supervision.
- Have good customer and communication skills.
- Have a keen eye for detail and continual improvement.
- Good time management with a focus on safety.

We currently have 3 positions available listed below.

SPREADER DRIVER

This role is for a Spreader driver to operate one of our Modern Fleet of spreader trucks with the latest in vehicle management technology to apply fertilisers to our clients farms.

A heavy combination licence and tractor/agricultural experience would be preferred however training can be arranged for the right applicant.

DRONE PILOT

This role is for a Drone pilot to join our team to operate our growing fleet of drones in an exciting new area of the business. Spreading, Spraying, Mapping and other various tasks.

Training and licensing will be provided to the successful applicant.

LOCAL TRUCK DRIVER

This position is to operate our modern fleet of trucks to deliver product to our local farms with Rigid trucks and dog trailers.

A Heavy combination license is required to complete this role.

Each of these secure positions will be based out of our Jancourt depot located 10 K's east of Cobden. Remuneration will be based on experience.

For further information please contact Mark Webber & Chivell, 29 Cowleys Rd, Cobden, Vic 3266
Ph: (03) 5594 6294
Email: mark@webberchivell.com.au

CLASSIFIEDS

PHONE
5231 5322

ADVERTISE YOUR POSITION WITH US.

PUBLIC NOTICES

PUBLIC NOTICE

beach

Continuing to meet Australia's gas needs

Beach Energy supplies the Australian east-coast gas market through production at the Otway Gas Plant near Port Campbell and the Lang Lang Gas Plant 80km south-east of the Melbourne CBD. To continue meeting natural gas demand from homes, business and industry, Beach has commenced planning and consultation for the Offshore Gas Victoria (OGV) Project.

Activities and Timing

Subject to all required approvals, from early 2024, there will be several activities in offshore Commonwealth waters south of Port Campbell and in Bass Strait in existing production and exploration licenses held by Beach. Activities will involve different phases including seabed assessments (non-seismic), removing suspended wells, as well as drilling and connecting new wells to existing pipelines.

Environment Plans

The OGV Project will require Environment Plans to be accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) before commencement of activities.

Environment Plans must include a description of the existing environment and the proposed activities, an evaluation of the impacts and risks, environmental performance outcomes and controls, implementation strategy, and reporting requirements.

Consultation and feedback with Relevant Persons whose functions, interests or activities may be affected by the project activities is an important part of developing Environmental Plans.

Consultation

As a local operator in Victoria, Beach has conducted transparent and respectful consultations with Commercial Fishers, First Nations groups, local communities and other Relevant Persons for many years.

If you think your functions, interests or activities may be affected, we would like to consult with you to understand your concerns, and where possible, explore measures to reduce any impacts or risks.

Relevant Persons may request that the information they provide not be published in the Environment Plan.

If there is someone you believe may be affected by the proposed activities, please ask them to contact us.

Further Information

Project information sheets, activity location maps and further information on consultation can be accessed via the QR code below.

P 1800 797 011
E community@beachenergy.com.au

beachenergy.com.au/ogv

READ MORE

King Island Courier

It's written in the stars

with SABINE GABAUER

THIS week is Full Moon week in the commercial sign of Gemini.

Be prepared for confusion, mafia or delays as the party season begins.

Life might be a buzz with end-of-year tasks at work or school and the onset of the holiday season.

There is a catch though this week as the ruling planet Mercury might be playing some tricks with us.

While our desires are potent, we might have to face some hurdles and obstacles. My advice for this week: Be the observer when it comes to any reactivities and find gentle and healthy ways to navigate any feelings of anger and resentment.

Slow and steady wins the race...

ARIES

Dear Aries. This week's Full Moon might be playing some tricks around your everyday communications and what you believe to be true. As much fire as is ignited within you to hunt and hunt out your means, this week asks for deeper reflection and contemplation. You can do it Ram!

TAURUS

Dear bull, your emotional life assumes more and more importance this week. It can be tricky at times. Buried anger or resentment can have a way of emerging when least expected. However, it's a good time to manage all these matters fearlessly rather than sweeping problems under the rug. Feel the sand beneath your feet and take a deep breath!

GEMINI

This week opens a container of challenges, pleasures, and learning experiences through and with others. It's an incredible period for collaborating or simply enjoying more interaction and fun exchanges with someone special. Seeing things from a new perspective will assist in navigating through any relational obstacles.

CANCER

You are rolling up your sleeves this week, putting more muscle and personality into improving your work, health, daily routines, and self-care programs. You are actively taking care of business, organizing, and improving your work. Find healthy outlets for possible impatience and impulsiveness. Hit the gym, climb stair equipment!

LEO

This last week of November brings social, creative, and romantic excitement into your life. Your innate boldness gets fired up as you express your creativity and feeling world in new ways. This week could bring a turning point within a project or a culmination of blossoming. Keep any extravagant notions in check.

VIRGO

This week's Full Moon can bring a secret matter or project to fruition, stimulating much activity surrounding responsibilities or professional life... Particularly if you've been so deeply involved in your personal life that you've had less time for duties to the outside world. Relationships require more tenderness and care as challenges might arise.

LIBRA

This week's ideal house invites you to awaken your true feelings about a course of study or project, which can propel you into a new direction or reinforce your commitment to the path you are already on. There is a call to expand your interests and experiences. Enjoy polishing up your skills! Check out Phoenix House for any offerings.

SCORPIO

This week's Full Moon highlights your money and possessions. You re-evaluate where you are at financially and you might come up with creative ideas on how to earn more or live more sustainably with what you already have. Dissolve any rigid ideas and allow some flow.

SAGITTARIUS

This last week of the month uplifts your energy and vitality to pursue your plans. You are looking to improve and pioneer. It's also a time for improvising and enjoying yourself as you do. Still, emotions could run high bringing personal epiphanies as well as relational adjustments into your life.

CAPRICORN

All you goats out there, any issues surrounding work and wellbeing deserve your attention. There could be a bit of a scramble to meet deadlines or deal with chores and duties. Pay attention to what's pushing your buttons at this time, as it can be very revealing.

AQUARIUS

This week highlights creative endeavors and your relationships. You might feel stuck between two alternatives. These could be an ultimatum, a new opportunity arising, or a romantic revelation with this location occurring in your realm of playfulness. Your feelings might be intense, hard to ignore!

PISCES

This week prompts more attention to your personal life, family, or needs for quiet, safety, and familiarity. Responsibilities and problems can undoubtedly magnify in your mind, but this is an empowering shift for clarity and self-discipline. Be sure to recharge so that you can give other areas of life your best.

PUBLIC NOTICE

beach

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E community@beachenergy.com.au

engage.beachenergy.com.au/

READ MORE

Administrative Assistant

King Island Hospital and Health Centre
North West Area Health Service
King Island, Tasmania

Vacancy No: 502425

Salary: $62.257 - $66.917 per annum pro rata + 11% superannuation + access to salary packaging

Department of Health are seeking a motivated Administration Assistant to provide efficient and effective administrative support to services within the King Island Hospital and Health Centre.

The King Island Hospital and Health Centre, located off Tasmania's north west coast, operates as a multipurpose centre with four acute care beds, a palliative room with adjoining family room, two emergency rooms, Treatment room, outpatients consulting rooms, 14 permanent residential aged care and respite care beds. The Centre also coordinates the delivery of a broad range of community services, visiting service and support groups such as community nursing, child health, dental services, ante-natal clinics and alcohol and drug services. The facility is the home of health services for the community and the general practice is co-located with two resident general practitioners providing primary health care and emergency assistance when required.

Details of appointment

Multiple Fixed term part time shift-worker positions are available working up to 39 hours (6 days) per fortnight commencing ASAP until 30 June 2024.

Applications close:
10 December 2023.

To find out more about this role, please contact Anita Beasly by calling (03) 6462 9900 or email anita.beasly@dhhs.tas.gov.au

Tasmanian Government

Apply online at www.jobs.tas.gov.au

Visit us at www.dhhs.tas.gov.au - Like us on Facebook

Photo: Karlen Barnes

Portland Observer

Classifieds ONLINE PLACEMENT

FOR HIRE

SKIPPER, 1 to 18 M3 bins, waste removal, commercial, residential. Contact Kelcar 0417 048 874.

FOR SALE

CARAVAN, Grand Guide Royal Guest Series II, 22', off-road, all mod cons, one owner, many extras / spare parts, excellent condition, $70,000. 0427 112 408. Email for photos: gsamarti@bigpond.com

CHRISTMAS TREES
Nectarine
Farm Sales:
292 Bailey's Rd,
Gorae West
Fri 24, 25th Nov.
Sat/Sun
10am - 6pm
Town Sales:
Masonic Lodge
Cormack
(Opposite McDonalds)
Fri 24 Thurs, 30th Nov
Thurs/Fri 1-6pm &
Sat 9am-1pm
Visit FB/Insta for more information

FREE fuel tank, 180 litre; $100 o.n.o. Phone 0419 867 633.

FREE - Upright piano, old, tuned, good condition, pick up only. 0428 586 078.

FULL size pool table, $350. 0419 548 022.

JACOBEAN couch and 2 chairs, very good condition; $100. Phone 0428 372 731.

MUNDER of white single fat sheets, warm Acrl, 1.5 x 2.5 each. Phone 0419 867 686.

WEBER Q BBQ, all attachments, with cover, never used; $450. 0419 070 828.

GARAGE SALE

46 Aberdeen St, Fri-Sat. 8am. Lots of bargains. Jayco caravan, pool table and extras. Stationery tools, household goods.

LOST

BLACK swimmer's watch, lost at Nun's Beach. Please phone 0418 837 267.

WORK WANTED

ANTENNA installations and service, including TV wall mounting, TV points and tuning. Call Peter Logan 0419 366 711.

WORK WANTED

SNC TreeTech
Certified Arborists/Climbers

- Tree Pruning & Removal
- Stump Removal
- Mulching
- Tree Stump Grinding
- Fully Insured & Licensed
- Free Quotes (Before Up)

No obligation Free Quotes
Shaun Clark
0408/017 901
Find us on Facebook

CONCRETING, all types. B.M. Jennings Concreting, phone Brent 0428 334 721.

THREE TOP TECHNICIANS. Arborist. Free quotes and advice. PORTLAND 0423 226 788.

MEETINGS

Portland RSL Sub Branch Inc
A.G.M.
Tuesday, 5th Dec
7pm
IN THE ROOMS
21 Percy St
All welcome

HEALTH & BEAUTY

HEALING Energies massage, reiki, reflexology, pregnancy massage, Indian head massage, reflexology, ear candling. Phone Paula 0429 467 342.

DEATH

CARR - Frank William "Bill". Passed away peacefully on 19/11/2023 aged 79 years. Loved Dad and Father-in-Law of Nicki and Mark. Cherished Poppy of Lexie and Ben.
"Forever in our hearts".

PARKER - Thomas Edward, passed away peacefully at Harbourside Lodge, Portland on 20/11/23, aged 87 years.
Loving husband of Daisy; father of Doug (late wife Jennifer), father-in-law of Joy. Dear pa Tom to his grandchildren and great grandchildren.
Forever remembered.

PARKER - Thomas.
Loving husband of Daisy.
72 wonderful years of marriage.
At peace.

PARKER - Thomas Edward.
Much loved father of Doug and Joy; Pa Tom of Paul and Christelle, Nicole and Shane, and Scott; Great Pa of Zavier, Levi, Brandon, Cooper and Duncan.
Remembered always, so sadly missed.

DEATH

PARKER - Thomas.
Adored father of Jeanette and grandfather of Jeremy and Celeste; loved great pa of Jack, Noah and Maya.
Forever in our hearts.

SUTHERLAND - Stuart "Stewy", passed away on 14/11/2023. Loved Dad of Reese and Rhiana. Loved Pop of Ava, Mia, Carter and Levi.
"Higher Than Heaven"

FUNERAL

CARR - The Funeral Service for the late FRANK WILLIAM "BILL" CARR is to be held at the GRAVESIDE, Portland South Cemetery, Cape Nelson Road, Portland on TUESDAY the 28th NOVEMBER, commencing at 2.00pm.

PORTLAND FUNERAL SERVICES
140 Percy Street,
Portland, 3305
Phone (03) 5523 2078

SUTHERLAND - The Funeral Service for the late STUART "STEWY" SUTHERLAND is to be held at THE ROYAL HOTEL, Percy Street, Portland on FRIDAY, the 24th NOVEMBER commencing at 12PM.

PRIVATELY CREMATED

PORTLAND FUNERAL SERVICES
140 Percy Street,
Portland, 3305
Phone (03) 5523 2078

EMPLOYMENT

Robertson
CIVIL SERVICES

CAPITAL WORKS/ PROCUREMENT CO-ORDINATOR

Robertson Civil Services is a local family-owned company working as an unlimited contractor in Portland Australia.

We are currently looking for expressions of interest for a Capital Works/Procurement Co-ordinator

The capital works/procurement co-ordinator will be responsible for;

- Provide estimates in line with BOMs and specifications.
- Engage and liaise with relevant site and external stakeholders.
- Source and secure the best cost-effective sub-contractor and material supply chains.
- Control project planning and schedules from inception to completion.
- Work with relevant parties to complete projects, ensuring compliance with permits, approvals, and safety plans.
- Complete site access approvals for external sub-contractors.
- Work closely with site teams and external companies to minimise disruptions to daily operations.
- Have a safety and can-do problem-solving attitude.

For more information on this role you can contact Jason Mitchell on 0408 184 078

Resumes can be forwarded to:
E: [illegible]
M: PO Box 409, Portland VIC 3305

Applications close COB 1st December 2023

MEMORIAL

Lions Club of Heywood Inc

CLEARANCE SALE

ANITRA REYNOLDS LIONS CLUB PROGRAM

Sunday, 26th November - 10:30am

At: Jamie and the Late Bob Crozier
2007 Princes Highway Lyons 200m S of Heywood

Aluminium Fishing Boat, Rods, Tools, Press Drills, Metal Lathe, Welder, Power Tools, Bitesizing Grinder, Steel Shelving, Steel Work Benches, Mobile Overhead Gantry, Honda Generator, Hydraulic Press, Antique Avery Platform Scales, Sunshine Farm Gates, Plus a large quantity of sundries and Collectables.

Auctioneer - Stacey Lyngsfield

Refreshments supplied by Heywood Lions.

Enquiries: Call 0477 [illegible]

PUBLIC NOTICE

beach

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E community@beachenergy.com.au
engage.beachenergy.com.au/

READ MORE

Notice of Public Comment

ConocoPhillips Australia Otway Exploration Drilling Program Environment Plan

ConocoPhillips Australia is inviting public comment on the Otway Exploration Drilling Program Environment Plan. The public comment period will run for 30 days between 16 November and 18 December 2023.

The public can view the Environment Plan and associated documents on the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) website by visiting https://consultation.nopsema.gov.au

About the proposed activity: ConocoPhillips Australia is planning to undertake exploration activities in offshore permits VIC/P79 and T/49P located in Commonwealth waters of the Otway Basin, 19 km offshore of Victoria and 28 km offshore of King Island, Tasmania.

The proposed Otway Exploration Drilling Program involves seabed surveys at up to a maximum of nine locations, and drilling up to a maximum of six exploration wells in water depths ranging from 53 m to 500 m. The activity is scheduled to commence no earlier than 1st of April 2024 and will be completed no later than 31st of December 2028, with the exact timing dependent on the acceptance of the Environment Plan and the availability of a mobile offshore drilling unit.

ConocoPhillips

South Gippsland Sentinel Times

PUBLIC NOTICES

GIPPSLAND SOUTHERN HEALTH SERVICE

31ST ANNUAL GENERAL MEETING

YOU'RE INVITED

The Board of Directors request the pleasure of your company

Join us as we reflect on the 2022/2023 year and celebrate our achievements.

OUR GUEST SPEAKER

Dr. Swati Mukherjee, Cardiologist, will share information on Cardiac Disease in South Gippsland.

Followed by light refreshments.

RSVP Thursday 30th November, 4.00pm
IPCC Meeting Room, Leongatha Campus

By: Friday 24 November 2023
Email: dallas.aurace@gsha.com.au | Phone: 03 5667 5514
*Please note, there will be no virtual meeting arrangements

Beloka dog trials success

Duke carefully manoeuvres the sheep to where he wants them in the finals of the Open Yard Trials.

This helpie flew up to 2.53 metres to take out the Winner of the Dog High Jump at the Beloka dog Trials.

13-month-old Milly rounds up the sheep towards the pen in her first yard trials in the Encouragement Section.

Megan Campbell's dog Hel rounds up the ewes in the Novice Cattle Trial.

PUBLIC NOTICES

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beach

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E community@beachenergy.com.au
engage.beachenergy.com.au/

READ MORE

4823-024

PUBLIC NOTICES

VOLUNTEERS NEEDED!

We are building a healthier community in South Gippsland, together.

Gippsland Southern Health Service is looking for a diverse range of enthusiastic people from our local community to join our Volunteer team.

Volunteers may be assisting in a range of areas across GSHS including our:

- Aged Care Facilities
- Planned Activities Groups
- Administration
- Patient Transportation

Possible locations include;
Korumburra, Leongatha, Mirboo North & Tarwin Lower.

Reach out to our Volunteer Co-Ordinator for more information or scan the QR code to fill out an application.

Phone Number
(03) 5667 5538

Email Address
volunteer@gshs.com.au

Bairnsdale Advertiser

Four years and no answers

Page after page of blacked-out documents and no real information - that was the result of Wellington Shire Council's attempts over almost four years to find out why the State Government decided to close the native forest industry.

The decision meant two of Australia's most dynamic and innovative timber processors - Australian Sustainable Hardwoods at Heyfield and Radial Timber in Yarram - faced potential destruction and the loss of more than 200 jobs in the municipality.

Wellington Shire's Mayor, Cr Ian Bye, said the council first sought clarification from the State Government about changes to the Victorian forestry sector via a Freedom of Information (FOI) request in July 2020, just months after the Victorian Government first announced substantial changes to the industry.

"After almost four years, interventions by the Office of the Victorian Information Commissioner (OVIC) and considerable investment, a heavily redacted document was finally received," Cr Bye said.

"However it provided no detail of the scientific data used as the basis to end Victoria's native timber harvesting industry, one that has been the backbone of small communities for generations.

"Based on these actions, it is clear to me that this evidence either does not exist, or the government is unwilling to share it with the communities most impacted."

Cr Bye said the State Government had made it clear its decision was final.

"Through our advocacy work, we have been able to secure stronger support for timber communities through the 'Future of Heyfield' and 'Future of Yarram' transition projects, with funding provided by the Victorian Government," he said.

In November 2019, when the Victorian Government announced the native forest industry would close in 2030, it pledged $120 million in transition support for the affected communities.

However, the decision in May to cease native timber industry operations in Victoria from January 1, 2024, was made without any prior consultation, discussion, or presentation of evidence to support the government's claim that the industry was environmentally unsustainable.

In July 2020, Wellington submitted an FOI request to understand the scientific basis behind the decision. After a year of persistent follow-ups, intervention by the Office of the Victorian Information Commissioner and lengthy response delays, the Department of Premier and Cabinet granted access to only two out of 51 related records, with 29 others partially accessible.

Access was refused to 20 documents; those received were heavily redacted and offered limited insights into the scientific data on which the State Government based the Victorian Forestry Plan.

The council, despite disagreeing with the government's stance and apparent lack of evidence, has been collaborating with the state government to identify timber transition opportunities, especially for those in affected communities including Heyfield and Yarram.

The council says it remains disappointed by the abrupt decision to shut down the timber industry, but appreciates $140,000 funding through the Local Development Strategy projects funded by the state government's Forestry Plan, which will run until August 2024.

Most recently, another $93,500 from the government's Community Development Fund will be used to create an integrated manufacturing cluster masterplan. Timeline for the FOI request:

- July 3, 2020 – first Freedom of Information (FOI) request submitted to Victorian Government
- August 31, 2020 - clarification of scope of FOI provided to government (via Department of Premier and Cabinet)
- September 14, 2020 – Council officers followed up because nothing had been received, advised to expect response by September 30, 2020
- October 2020 – Council officers followed up again when nothing was received
- October 2, 2020 - Council advised that a decision is yet to be reached due to "greater caseload".
- December 10, 2020 - Still no response received, State Government advised council that delays were unavoidable due to 'increased caseload'.
- December 16, 2020 – Council officers requested update, received advice that a response expected mid to late January 2021.
- January 25, 2021 – Council officers requested another update, state government advised of a delay because of a backlog in requests in the second half of 2020.
- May 4, 2021 – Council received advice from the Office of the Victorian Information Commissioner (OVIC). They are continuing to follow up with the agency for a decision and the matter had been escalated to the Assistant Commissioner at the OVIC.
- July 20, 2021 – Council received a letter from the Department of Premier and Cabinet advising that of the 51 records relevant to the request, we would be granted full access to two documents, partial access to 29 documents, and no access to 20 documents. These documents were heavily redacted and disclosed very little information regarding the data that the State Government relied upon in relation to the Victorian Forestry Plan.

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Melbourne Depot - Vic Freight Specialists, 126, 13-17 Program Street, Dandenong, 3175

Omeo Depot - Omeo Welding & Engineering & Equipment Hire, 87 Ellis Street, Omeo, 3898

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Mobile: 0412 310 007 | E: admin@grinter.com.au

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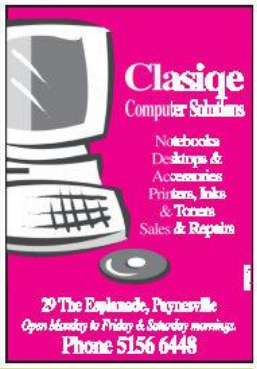

PNC Paynesville Neighbourhood Centre

PCC Paynesville Child Care

New Committee Members Wanted!

For all enquiries or for more information, please contact Julia on:

0459 939 607 or at manager@pnc.vic.edu.au

PUBLIC NOTICE

beach

Community information session and webinar series

To continue meeting natural gas demand from homes, business and industry, Beach Energy has commenced planning and consultation for the Offshore Gas Victoria (OGV) Project.

The community information session and webinars will enable the local community to learn more about the OGV Project, which is considering a range of activity in the Commonwealth waters across several phases. The session and webinars will focus on drilling and plug and abandonment activities.

We are committed to working with our local communities, ensuring people are informed of our projects and can provide feedback. Stakeholder consultation is an important part of our planning as it helps identify any local concerns and ensures management of potential impacts.

If you would like to ask our technical staff questions about our projects or provide feedback, please drop into our information session and/or join our webinars. Please register your interest in joining one or more of the webinars by emailing community@beachenergy.com.au.

Webinar series

Wednesday 22 November 2023, 5pm to 6pm
Drilling and Plug and Abandonment activities explained, including Q & A

Wednesday 29 November 2023, 12pm to 12.30pm
Drilling Q & A with Beach technical team

Thursday 30 November 2023, 1.30pm – 2pm
Plug and Abandonment Q & A with Beach technical team

Community information session

Wednesday 29 November 2023, 4pm to 6pm
Drilling and Plug and Abandonment activities explained
Lakes Entrance Mechanics Hall, 18 Mechanics Street, Lakes Entrance

We welcome your questions, please contact:

P 1800 797 011
E community@beachenergy.com.au
engage.beachenergy.com.au/

READ MORE

Circular Head Chronicle

Classifieds

Advertise free any single item under $50 | Deadline 9.30am Tuesday
Phone 03 6452 3333 | Email ads@chchronicle.com.au

GARAGE SALE

Saturday November 25, 8am - 2pm. 24 Brittons Road, Smithton.

CHURCH NOTICES

Circular Head ANGLICAN
SMITHTON 10am
Every Sunday with Holy Church
Just Marriage - 0428 078 [illegible]
www.circularheadanglicanparish

dreambuilderschurch
Every Sunday
10am
Pastor Matt & Sharon Nuske
Ph: 0408 307 634
meetings held in the Vinnies building
www.dreambuilderschurch

Presbyterian Church
Stanley 10.30am
Jack van der Wal

MEETINGS

Notice is hereby given of the Circular Head Netball Association AGM. Monday December 4, 6.30pm at CHCRC. All positions vacant, nominations now open. Please email chnetballassociation@gmail.com or message Alicia Dudman on 0419 207 092 for nomination form. We need volunteers to join our committee. Please consider helping out if you're a parent, grand parent, player, coach or netball lover.

PUBLIC NOTICES

PUBLIC NOTICE

beach

Community Information Webinars

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P 1800 797 011
E community@beachenergy.com.au
engage.beachenergy.com.au/

READ MORE

POSITIONS VACANT

SmithtonJoinery

Smithton Joinery (Tasmania) Pty Ltd

Smithton Joinery, locally operated joinery business that specialises in the manufacturing, assembly and installation of stylish kitchens, bandrooms, vanities, wardrobes and cabinets.

Under new management and set for growth. We are now looking to expand our team.

Junior or adult apprentice (cabinet maker)

Trade qualified or handypersons, part or full time.

The positions involve manufacturing and assembly of cabinetry in our factory, as well as installations on various job sites in Circular Head and surrounding areas.

The successful candidate must:

- Be passionate about a career in the joinery/cabinet making industry.
- Multitask as well as manage time efficiently.
- Be motivated and willing to learn.
- Have an eye for detail.
- Work effectively as part of a team.
- Have well developed literacy and numeracy skills and be able to read and follow instructions.
- Previous work experience is also highly desirable but not essential.

If this position sounds like the perfect career opportunity for you.. we'd love to hear from you!

Please email your resume and cover letter to [illegible] by COB Friday 1st December
For further information please call Luke 0429 589 586

CIRCULAR HEAD COUNCIL

25TEN COMMUNITY COORDINATOR

Circular Head Council is seeking a highly motivated individual to fill the new position of 25TEN Community Coordinator.

This 12-month fixed term contract will implement the Learn to Life project that supports adults in the local area to lift their literacy and numeracy skills.

The successful applicant will need:

- A tertiary qualification within a relevant field and at least 2 years' experience in a project management role.
- Demonstrate understanding of adult literacy and numeracy and associated issues as well as knowledge of and ability to apply the Australian Core Skills Framework (or ability to quickly gain this knowledge).
- Effective and well-developed stakeholder management, communication, and interpersonal skills to work on shared ways with diverse range of stakeholders.
- Excellent organisational and sound computer skills to meet deadlines under conflicting pressures while being able to meet stakeholder needs and expectations.
- Demonstrated problem solving and decision making abilities.

All applications MUST clearly address the essential Selection Criteria which is listed in the Position Description.

Any offer of employment will be subject to the outcome of a pre-employment medical assessment and current National Police Check.

For duties are available on Council's website www.circularhead.tas.gov.au or contact Kayla Keighran 03 6452 4828.

Applications must be received by 5pm Thursday 30th November 2023

Vanessa Adams
GENERAL MANAGER
PO Box 348 Smithton 7330
Phone: 03 6452 4800
E mail: council@circularhead.tas.gov.au
Web: www.circularhead.tas.gov.au

CIRCULAR HEAD COUNCIL

CENTRAL OUTDOOR AREA MANAGEMENT COMMITTEE ANNUAL GENERAL MEETING

The Central Outdoor Area Management Committee Annual General meeting will be held on Monday 4 December 2023, 7pm at the Circular Head Community & Recreation Centre, Court St Smithton.

Sporting users and interested community members are welcome to attend and seek nomination to the committee.

All positions will be declared vacant at this time:

Chair
Secretary
Committee Members (up to 7 positions)

Nomination forms are available from Council offices or Council's website www.circularhead.tas.gov.au

Return completed nomination forms to Council offices by 5pm Friday 1 December 2023.

For further information contact Deb Heinwering 6452 4800.

Vanessa Adams
GENERAL MANAGER
PO Box 348 Smithton 7330
Phone: 03 6452 4800
E mail: council@circularhead.tas.gov.au
Web: www.circularhead.tas.gov.au

TRAINING

STUDYCENTRE CIRCULAR HEAD
Regional University Study Hub
12 Nelson Street Smithton 7330

Upcoming Training Opportunities
30th November Leader ship Essentials
1 day introductory workshop program 8am-4pm
RTO 70217- Transtegic Training
email your nominations to info@transtegic.com
or call us on 1300 986 125

7th December Money Minded - Personal Finance Tips
9am-10am, for further details please contact
Verity - Financial Literacy Officer -
Verity@womenslegaltas.org.au or 6349 1943

for all further enquiries

Contact Patsy ☎ 0438 302 624
students@studycentrech.com.au

NEED TO ADVERTISE?
Contact the Circular Head Chronicle today!
6452 3333
ads@chchronicle.com.au

Wynyard Concert Band Presents
Music @ Mannwah

- Saturday November 25, 2pm at the Mannwah Hall
- $10/$5 concession
- Door sales
- Afternoon tea provided
- Phone 0406 354 574

Music from stage, screen and classical

Design the cover for our Christmas Chronicle

This year the *Circular Head Chronicle* would like to invite children from Kindy to Grade six to enter our Christmas Chronicle competition.

We are asking for children to draw a picture that shows their idea of an Aussie Christmas, and the winning picture will become the front page of the Christmas edition on December 20!

Pictures must be portrait and on white paper and can be dropped into the Chronicle office by Monday December 11, 5pm

The competition is open to all primary aged children, including members of the Homeschooling community.

The Border Watch

Network Classifieds

sales@networkclassifieds.com.au
networkclassifieds.com.au
1300 666 808

Trades & Services

Deadline

Placing your classified advert is so easy...
Phone: 1300 666 808
Email: sales@networkclassifieds.com.au
(include your name, address and phone number)
We accept payment by:
VISA/MASTERCARD/EFTPOS/BANK TRANSFER
(1.5% credit card processing fee applies)
Deadlines
Booking and Copy: 10.30am Tuesday
Final Approval: 11am Tuesday
Classifieds

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SPEND LESS TO PRINT!
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Scissor lifts 7.8mt to 12mt
Telfer Engineering PTY LTD
27 Wellington Street, Bordertown, S.A. 5268
Phone (08) 8752 1902 | Mobile 0438 521 902

General Notices

Public Notices and Event

MILLICENT CANCER SUPPORT GROUP AGM
to be held at the Millicent RSL Hall at 5.30pm on Tuesday 28th November 2023. Meal to follow at the Somerset Hotel. New members are most welcome. Enquires to Lisa 0407 872 587

Classifieds
Find it in the **Trades & Services** section of Network Classifieds.
1300 666 808

Public Notices and Event

The management and staff of McBride Operations Pty Ltd at Telopea Downs
would like to thank the CFA and CFS volunteers, neighbours and community members who worked together to defend our property against the fire at Blue Hills on 10th & 11th of November.

Bordertown Football Club Annual General Meeting
Wed 29th November 7.30 pm
in the clubrooms
Apologies to the Secretary
0407 612 267
or bfc00@bigpond.com

Find it in the **General Classifieds** section of Network Classifieds.

General Notices

Public Notices and Event

Notice of Public Comment

ConocoPhillips Australia Otway Exploration Drilling Program Environment Plan

ConocoPhillips Australia is inviting public comment on the Otway Exploration Drilling Program Environment Plan. The public comment period will run for 30 days between 16 November and 18 December 2023.

The public can view the Environment Plan and associated documents on the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) website by visiting https://consultation.nopsema.gov.au

About the proposed activity: ConocoPhillips Australia is planning to undertake exploration activities in offshore permits VIC/P79 and T/49P located in Commonwealth waters of the Otway Basin, 19 km offshore of Victoria and 28 km offshore of King Island, Tasmania.

The proposed Otway Exploration Drilling Program involves seabed surveys at up to a maximum of nine locations, and drilling up to a maximum of six exploration wells in water depths ranging from 53 m to 500 m. The activity is scheduled to commence no earlier than 1st of April 2024 and will be completed no later than 31st of December 2028, with the exact timing dependent on the acceptance of the Environment Plan and the availability of a mobile offshore drilling unit.

ConocoPhillips

Public Notices and Event

PUBLIC NOTICE

beach

Community Information Webinars

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Plug and Abandonment Q & A with Beach technical team

We welcome your questions, please contact:

P 1800 797 011
E community@beachenergy.com.au
engage.beachenergy.com.au/

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General Classifieds

Adult Services

JEYDA New in Town. Lovely Massage. Phone 0402 585 758

OLIVIA
25 years old
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Friendly
0478 756 919

Farm Services

HAY TARPS UV STABLE
Strong. Economical. Waterproof. In Stock.
1300 656 211 all hrs.
www.abctarps.com.au

Garage Sales

Mt Gambier, Griffiths St,
Sat 25th November 9am-1pm
Small freezer, gardening equipment, large floor mat, decorative items, clothes.
GRAB A BARGAIN
Bellons will be out on the day.

Motoring

Classifieds
1300 666 808

Find it in the **Celebrations** section of Network Classifieds.

Employment

Positions Vacant

Bordertown Stone Supplies
Plant Operator / Truck Driver
- HR/HC Licence
- Loader Licence
- UMAS White Card

Work in local area
Above award wages offered to the right person.
0430 924 322

Network Classifieds
1300 666 808

The Advocate

Local Government

DEVONPORT CITY COUNCIL
137 Rooke Street, Devonport TAS 7310
Phone: 03 6424 0511
www.devonport.tas.gov.au

APPLICATION FOR PLANNING PERMIT

Planning applications have been made for the following proposals:

Application No:	PA2023.0163
Proposal:	Hotel Industry - additions and alterations
Address:	80-82 Formby Road, Devonport
Application No:	PA2023.0164
Proposal:	Residential (multiple units 1x additional)
Address:	51 John Street, East Devonport
Application No:	PA2023.0166
Proposal:	Visitor Accommodation
Address:	2/168 Upper George Street, Devonport

The applications can be viewed at the Council offices or on Council's website. Section 57(5) of the *Land Use Planning and Approvals Act 1993* provides that representations can be made in writing to the undersigned at PO Box 604, Devonport or council@devonport.tas.gov.au by close of business on **4/12/2023.**

Matthew Atkins
GENERAL MANAGER

CENTRAL COAST COUNCIL
19 King Edward Street
Ulverstone Tasmania 7315
Tel. 03 6429 8900
admin@centralcoast.tas.gov.au
www.centralcoast.tas.gov.au

APPLICATIONS FOR PLANNING PERMITS

S.57 Land Use Planning and Approvals Act 1993.

The following applications have been received:

Application No.:	DA2023299
Location:	10 Ironcliffe Road, Penguin
Proposal:	Residential – shed (demolition of existing and construction of new shed)
Performance Criteria:	Building envelope
Application No.:	DA2023300
Location:	2 Lily Lane, Penguin
Proposal:	Residential – shed and water tank
Performance Criteria:	Building height, setback and siting

The applications may be viewed at the Administration Centre during office hours and on the Council's website. Any person may make representation in relation to an application [in accordance with s.57(5) of the Act] by writing to the General Manager at PO Box 220, Ulverstone 7315 or by email to admin@centralcoast.tas.gov.au by no later than **4 December 2023.**

Date of notification: 18 November 2023.

BARRY OMUNDSON
General Manager

BURNIE CITY COUNCIL

LOCAL GOVERNMENT NOTICE
Land Use Planning and Approvals Act 1993
Notice under Section 40G

Massy-Greene Drive, SOUTH BURNIE
CT 145244/1

Burnie Local Provisions Schedule
Combined Draft Amendment No. 2023/2
and permit application DA 2023/106

Burnie City Council has initiated a combined draft amendment of the Burnie Local Provisions Schedule and permit application as it applies to part of the land described in CT 145244/1 and known as Massy-Greene Drive, South Burnie so as to change part of the zone assigned to the site from Open Space to General Industrial zone and issue a planning permit for a Storage use.

The draft scheme amendment and planning permit may be viewed at the Burnie City Council Offices, 80 Wilson Street, Burnie between 8.30am - 5.00pm Monday to Friday inclusive or on Council's website at - www.burnie.tas.gov.au/permits

Any persons or bodies may make representation relating to the draft amendment and/or planning permit in writing addressed to the General Manager, Burnie City Council, PO Box 973, Burnie 7320 or burnie@burnie.tas.gov.au by no later than 5.00pm on **Tuesday 5 December 2023.**

Dated: Saturday 18 November 2023

Simon Overland
GENERAL MANAGER

TA5877407

www.burnie.tas.gov.au BURNIE CITY COUNCIL

Connect with Classifieds

Public Notices

SPRING & SUMMER 2023-24

Sustainable Timber Tasmania's Chemical Program

Sustainable Timber Tasmania

Pesticides can play an important role in efficiently establishing and maintaining healthy and productive forests. Sustainable Timber Tasmania uses chemicals in limited circumstances where it is essential to manage weeds and pests and promote optimal tree growth. There are two main uses:

- Insecticide application to prevent severe defoliation of eucalypt plantations by insect pests; and
- Herbicide application for controlling weeds prior to tree planting or sowing.

All chemicals used by Sustainable Timber Tasmania are approved for use by *Australian Pesticides and Veterinary Medicines Authority*, the *Australian Forestry Standard* and *Forest Stewardship Council* processes.

Sustainable Timber Tasmania has updated its website to list the coupes that:

- Are being monitored for potential insect control this spring/summer and therefore may require a chemical application between November 2023 and February 2024; or
- Are expected to require a herbicide application in the next 6 months.

Access Map

An access map is available on Sustainable Timber Tasmania's website (www.sttas.com.au) for stakeholders to use to assist in identifying coupes relative to their area of interest.

Stakeholder Input

Sustainable Timber Tasmania welcomes stakeholder input to inform its detailed operational planning and decision making. In particular, Sustainable Timber Tasmania seeks to identify:

- Whether stakeholders have any specific concerns related to potential chemical applications on particular coupes; and
- Any issues which should be considered in detailed planning and decision making for these coupes.

Stakeholders are encouraged to contact Sustainable Timber Tasmania's Engagement Team as early as possible to register their interest in relation to any particular coupes or for further information.

Contact us

(03) 6169 2800
stakeholder@sttas.com.au

sttas.com.au

BC • 9875

PUBLIC NOTICE

beach

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E community@beachenergy.com.au
engage.beachenergy.com.au/

READ MORE

GD23-0274

Public Notices

DEVONPORT CITY COUNCIL
137 Rooke Street, Devonport TAS 7310
Phone: 03 6424 0511
www.devonport.tas.gov.au

TEMPORARY CLOSURE OF PUBLIC STREETS
SCHOOLS TRIATHLON CHALLENGE – 23/11/2023 & 24/11/2023

The following closures will apply for the conduct of Schools Triathlon Challenge between the hours of 9:30am to 2:30pm on Thursday, 23 November 2023 and Friday, 24 November 2023:

- BLUFF ROAD (between WILLIAM STREET and GLOUCESTER AVENUE)
- WILLIAM STREET (between BLUFF ROAD and COLES BEACH ROAD)
- COLES BEACH ROAD (between WILLIAM STREET and COLES BEACH ROAD)

It would be appreciated if these closures could be noted.

Matthew Atkins
GENERAL MANAGER

Keystone TASMANIA

You're invited to the 2023 Keystone Tasmania public meeting!

We are excited to invite you to our upcoming public meeting on **Monday, 11 December 2023 at 10am - 12pm,** at the paranaple Convention Centre at 137 Rooke St, **Devonport. Registration and morning tea from 9:30am.** The Board will present an overview of Keystone's activity during 2023 and our plan for 2024.

We welcome all interested members of the Tasmanian building and construction industry and your feedback about current and future workforce development training needs and priorities.

RSVP by Monday 4 December 2023
email@keystone.com.au or,
1800 578 663.

Keystone's public meetings are held under section 8A of the Building and Construction Industry Training Fund Act 1990.

WARATAH WYNYARD COUNCIL

COMMUNITY CONVERSATIONS BOAT HARBOUR

WHEN: **Monday 27 November 6.00 – 7.30pm**
WHERE: Boat Harbour Surf Club
WHAT: Join Councillors and Senior staff for casual one-on-one conversations about the things that matter most to you in your local community. Drop in any time **between 6.00 and 7.30pm.**
RSVP: Light refreshments will be provided so please register your attendance for catering purposes.

To RSVP or for information on Community Conversations in other local areas visit www.warwyn.tas.gov.au or phone 6443 8333

Dated at Wynyard this day, 18 November 2023.
Shane Crawford, General Manager
Email: council@warwyn.tas.gov.au

TA5877414

www.warwyn.tas.gov.au WARATAH WYNYARD COUNCIL

See what the others don't
view | See all

King Island Council Meeting 17 August 23

17 AUGUST 2023

Offshore Gas Victoria (OGV) Project

King Island Council

beach

1

Compliance statements

beach

Disclaimer

This presentation contains forward looking statements that are subject to risk factors associated with oil, gas and related businesses. It is believed that the expectations reflected in these statements are reasonable but they may be affected by a variety of variables and changes in underlying assumptions which could cause actual results or trends to differ materially, including, but not limited to: price fluctuations, actual demand, currency fluctuations, drilling and production results, reserve estimates, loss of market, industry competition, environmental risks, physical risks, legislative, fiscal and regulatory developments, economic and financial market conditions in various countries and regions, political risks, project delays or advancements, approvals and cost estimates.

Underlying EBITDAX (earnings before interest, tax, depreciation, amortisation, evaluation, exploration expenses and impairment adjustments), underlying EBITDA (earnings before interest, tax, depreciation, amortisation, evaluation and impairment adjustments), underlying EBIT (earnings before interest, tax, and impairment adjustments) and underlying profit are non-IFRS measures that are presented to provide an understanding of the performance of Beach's operations. They have not been subject to audit by Beach's external auditors but have been extracted from audited financial statements. Underlying profit excludes the impacts of asset disposals and impairments, as well as items that are subject to significant variability from one period to the next. The non-IFRS financial information is unaudited however the numbers have been extracted from the audited financial statements.

All references to dollars, cents or $ in this presentation are to Australian currency, unless otherwise stated. References to "Beach" may be references to Beach Energy Limited or its applicable subsidiaries. Unless otherwise noted, all references to reserves and resources figures are as at 30 June 2018 and represent Beach's share. Certain FY19 planned activities are subject to joint venture approvals. References to planned activities beyond FY19 are subject to finalisation of work programs, joint venture approvals and Board approvals.

Reserves disclosure

Petroleum Resources Management System (PRMS) published by the Society of Petroleum Engineers. The reserves and contingent resources presented in this report were originally disclosed to the market in ASX release #034/18 from 2 July 2018. Beach confirms that it is not aware of any new information or data that materially affects the information included in the aforesaid market announcement and that all the material assumptions and technical parameters underpinning the estimates in the aforesaid market announcement continue to apply and have not materially changed.

Conversion factors used to evaluate oil equivalent quantities are sales gas and ethane: 5.816 TJ per kboe, LPG: 1.389 bbl per boe, condensate: 1.069 bbl per boe and oil: 1 bbl per boe. The reference point for reserves determination is the custody transfer point for the products. Reserves are stated net of fuel and third party royalties.

2

King Island Consultation

Opportunities

beach

- How are you feeling about our work?
- What would work best for your community? Consultation is about how. The if is a government decision.
- Commercial fishing/kelp challenges
- Beach gas supports King Island activities
- Radio/newspaper
- Sustainability journey

3

Offshore Gas Victorian (OGV) Project

Opportunity

beach

- Critical shortfalls of gas in the East Coast of Australia in the coming years.
- Gas required to provide firming back-up generation, as well as to support our critical industries
- To commercialise the last remaining fields Beach needs to simplify the current drilling and production concept
- OGV will focus on Otway Exploration and Appraisal opportunities (Artisan, La Bella, VIC/P43 exploration prospects) where recoverable volumes of petroleum are relatively small and may be optimally developed by a single well and utilising existing Otway pipeline and infrastructure.
- Beach has a strong track record of operating safely, and this was demonstrated by our recent offshore drilling campaign in 2021-2022

4

Planning commences for next phase of Otway offshore drilling

Project status

beach

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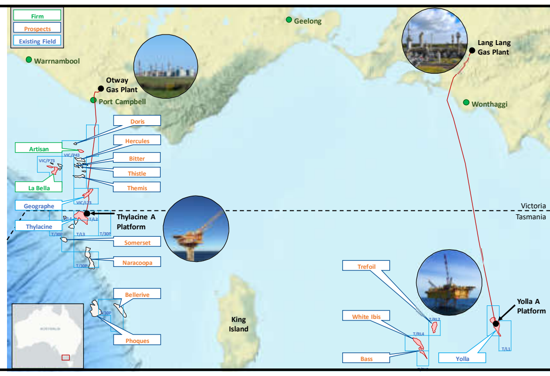

6

Offshore Gas Victoria (OGV) Project

Current scope

beach

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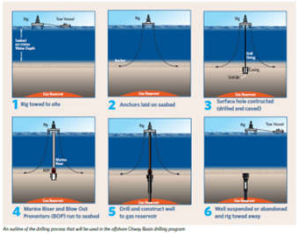
- Plug & Abandon 5 x suspended legacy wells in Otway and Bass Basins



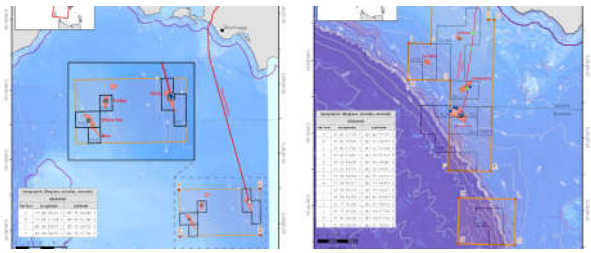
An outline of the drilling process that will be used in the offshore Otway Basin drilling program

7

Seabed assessment

Area maps

beach



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9

Commercial Fishing Peak Bodies Round Table 31 August 23

Commercial Fishing Peak Bodies – Round Table
Agenda

	Description	Action	Lead	Time
1.	Welcome and introductions	Noting	Sharon Donovan	5m
2.	Acknowledgement of consultation burden	Discussion	Neale Scott	5m
3.	OGV Overview	Discussion	Neale Scott	30m
4.	OGV engagement co-design	Discussion/ decision	Sharon Donovan	30m
5.	Future industry engagement	Discussion	Neale Scott	30m
6.	Next Steps / Close	Summary	Sharon Donovan	5m

1

31 AUGUST 2023

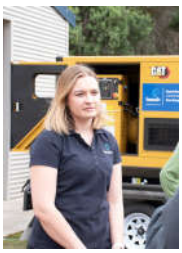
Offshore Gas Victoria (OGV) Project

Warrnambool 31 August 2023

2

Commercial Fishing Peak Bodies
Consultation Burden

- The commercial fishing sector is a priority for Beach.
- We are acutely aware of the time and resource pressures the broader offshore energy industry is putting on the sector.
- Explore more efficient ways to engage with the peak bodies and directly with the fishers themselves.
  - OGV
  - Broader industry



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Offshore Gas Victorian (OGV) Project
Opportunity

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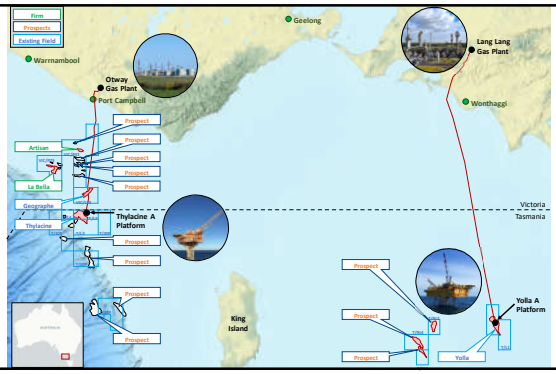

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Offshore Gas Victoria (OGV) Project
Current scope

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- Drilling additional exploration wells in VIC/P43 and suspend / complete in success case
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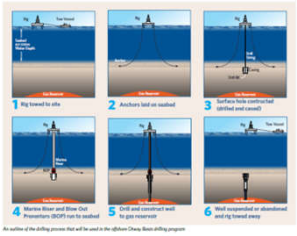

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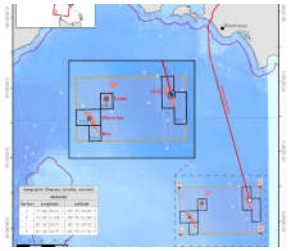
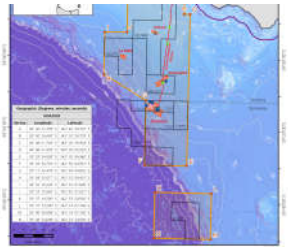
Seabed assessment
Area maps





8

OGV Consultation
What next?

- Assessing fishing activity history
- Impacts to navigation
- Current fishing activity
- Fishing gear assessment
- Conservation of fishing resources
- What have we missed?
- Co-design engagement

9

Future Industry Engagement
How can 'we' do better?

- Coordinating engagement
- Fishing data process
- Cumulative impact
  - Spatial mapping
  - Agree routes
  - Share resources
- Education/training
- Roles of commercial fishing peak bodies
  - Funding, service agreements
- Role of NOPSEMA/APPEA

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11

King Island Community Meeting 21 September 2023

21 SEPTEMBER 2023

Offshore Gas Victoria (OGV) Project

King Island Community

beach

1

Offshore Gas Victoria Project

beach

- We are an existing operator
- All activity is Offshore
- Utilising an existing platform
- Does not require seismic activity.
- The project is gas - not crude oil
- There will be no flaring
- We do not have authority over gas prices

2

Offshore Gas Victorian (OGV) Project

Opportunity

beach

- Critical shortfalls of gas in the East Coast of Australia in the coming years
- Gas required to provide firming back-up generation, as well as to support our critical industries (inc. LPG)
- To commercialise the last remaining fields Beach needs to simplify the current drilling and production concept
  - Relatively small volumes
  - Optimally develop single wells and utilise pipeline and platform
- OGV will focus on Otway Exploration and Appraisal opportunities including T-30P permit (60 km west of King Island)
- Beach has a strong track record of operating safely, and this was demonstrated by our recent offshore drilling campaign in 2021-2022

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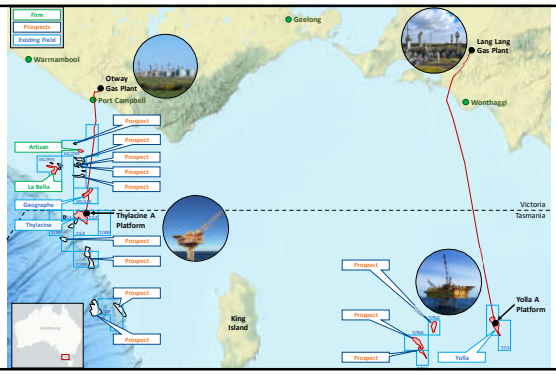

4

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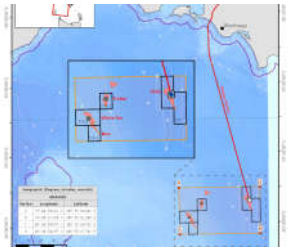
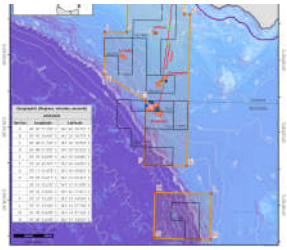
beach





5

OGV Consultation

What's happening currently?

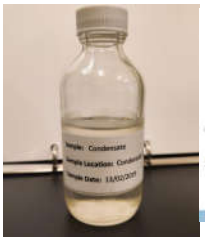
beach

- Assessing fishing activity history
- Impacts to navigation
- Fishing gear assessment
- Community consultation sessions underway to prepare Environment Plans
  - Seabed assessment activity EP first
- Offshore Project Proposal submitted to NOPSEMA (public consultation)

6

Environmental Response Plan

What happens if there is a loss of well control and condensate release?



AMOSC Australian Marine Oil Spill Centre

Australian Marine Oil Spill Centre (amosc.com.au)

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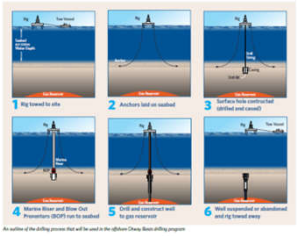

An outline of the drilling process that will be used in the offshore Otway Basin drilling program

9

Planning commences for next phase of Otway offshore drilling

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- Commenced community consultation
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10

Moyne Shire Council Meeting 17 October 2023

17 OCTOBER 2023

Offshore Gas Victoria (OGV) Project

Moyne Shire Council 17 October 2023

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1

Offshore Gas Victorian (OGV) Project

Opportunity

beach

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- To commercialise the last remaining fields Beach needs to simplify the current drilling and production concept
  - Relatively small volumes
  - Optimally develop single wells and utilise existing pipeline and platform
- OGV will focus on Otway Exploration opportunities to support the Otway Gas Plant
- Beach has a strong track record of operating safely, and this was demonstrated by our recent offshore drilling campaign in 2021-2022

2

Planning commences for next phase of Otway offshore drilling

Project status

beach

- Commenced community consultation
  - General sessions held in Port Fairy and Warrnambool.
  - Commercial fishers session Warrnambool
  - Peterborough Residents Association
- Currently consulting on environment plan (EP) for Seabed Assessment activity
- To be followed by a combination of drilling, "Plug & Abandon" and completion Eps
- Offshore Project Proposal submitted to NOPSEMA (public consultation)

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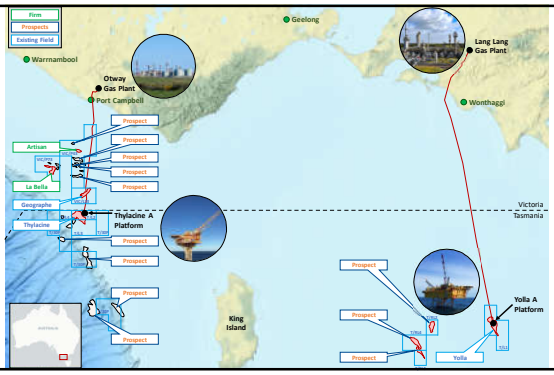

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Seabed assessment

Area maps

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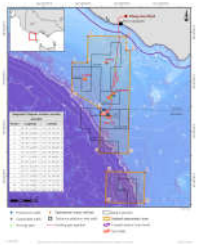

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Lang Lang Business & Community Group 19 October 2023

19 OCTOBER 2023

Offshore Gas Victoria (OGV) Project

Lang Lang 19 October 2023

beach

1

Welcome and Introductions

Agenda

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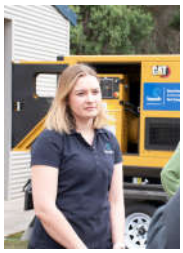
- Why Beach are here?
  - Beach Energy background
  - OGV consultation
- OGV Project Overview
  - Where, what and when
- Environmental response overview
- Q&A



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- P&A program across Bass and Otway
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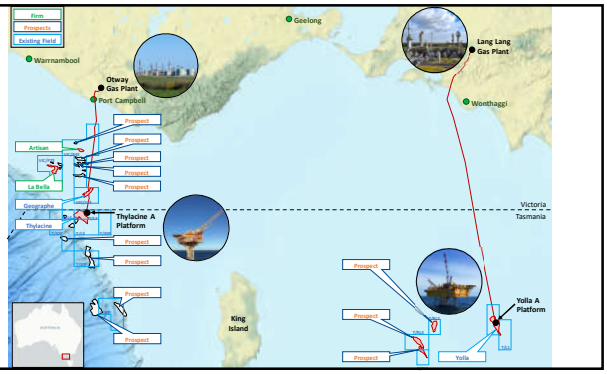

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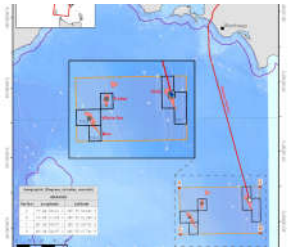

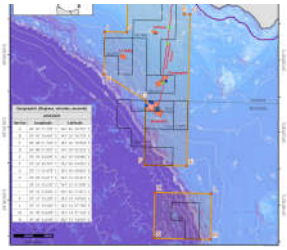

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Offshore Gas Victoria Project

Drilling and Plug & Abandonment Information Webinar

22 NOVEMBER 2023

beach

OFFSHORE GAS VICTORIA – DRILLING AND PLUG & ABANDONMENT

INFORMATION WEBINAR : AGENDA

Welcome and Introductions	• **Sharon Donovan** Senior Community Relations Manager (Vic)	
Offshore Gas Victoria - Project overview	• **Neale Scott** Community Relations Adviser - Offshore (Vic)	Presentation
Drilling and Plug & Abandonment	• **Brad Muir** Offshore Drilling Manager	Presentation
Emergency Planning and Environment	• **Phil Wemyss** Lead Health, Safety, Environment & Risk Adviser	Presentation
Speak to our Subject Matter Experts	• **Brad Muir** • Offshore Drilling Manager • **Phil Wemyss** Lead Health, Safety, Environment & Risk Adviser • **Candice Nayda** First Nations Engagement Manager	Q&A
Close	• **Sharon Donovan** Senior Community Relations Manager (Vic)	

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OFFSHORE GAS VICTORIA – DRILLING AND PLUG & ABANDONMENT

OFFSHORE GAS VICTORIA PROJECT OVERVIEW

Seabed assessment	Removal of wells	Drilling of wells	Completing and connecting of wells
Assessment of suitable locations for drill rig and new seabed infrastructure to connect wells **Earliest start January 2024**	Removal of five suspended wells through a formal procedure called 'plug and abandonment' **Earliest start November 2024**	Up to 11 exploration / appraisal wells **Earliest start November 2024**	Completing successful wells, installing infrastructure, and connecting wells to existing pipelines **Earliest start mid-2025**

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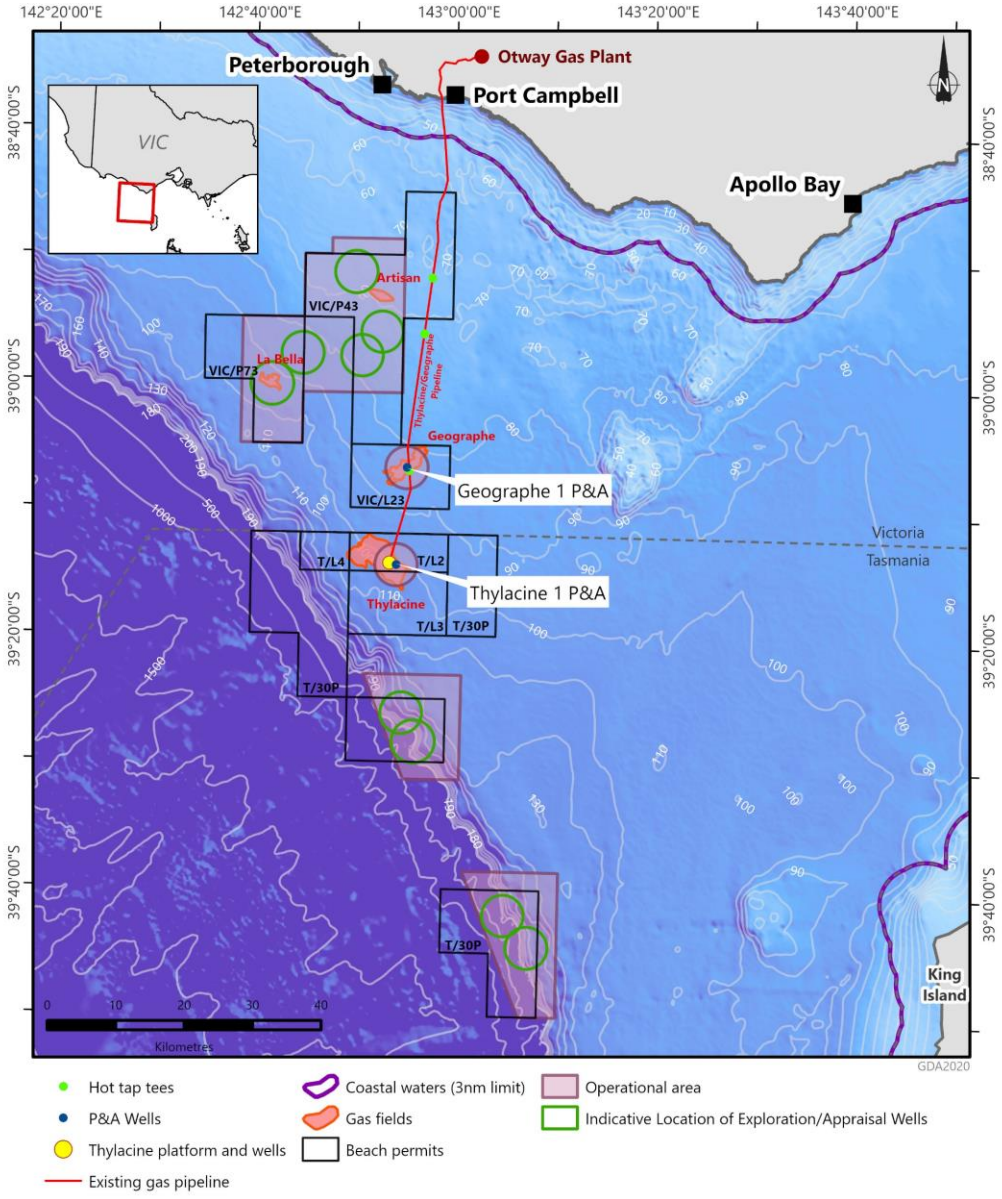
OFFSHORE GAS VICTORIA – DRILLING AND PLUG & ABANDONMENT

Otway operational area



14/11/2023

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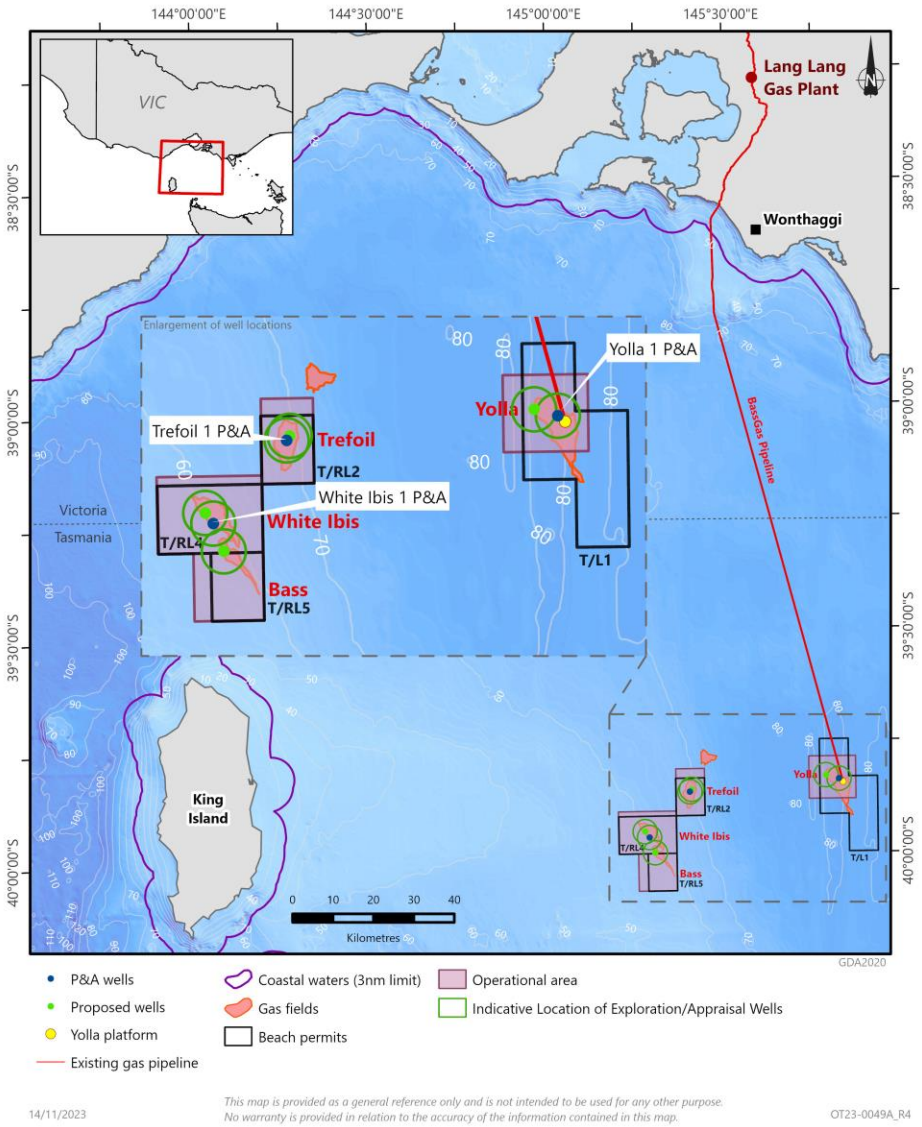
OFFSHORE GAS VICTORIA – DRILLING AND PLUG & ABANDONMENT

Bass operational area



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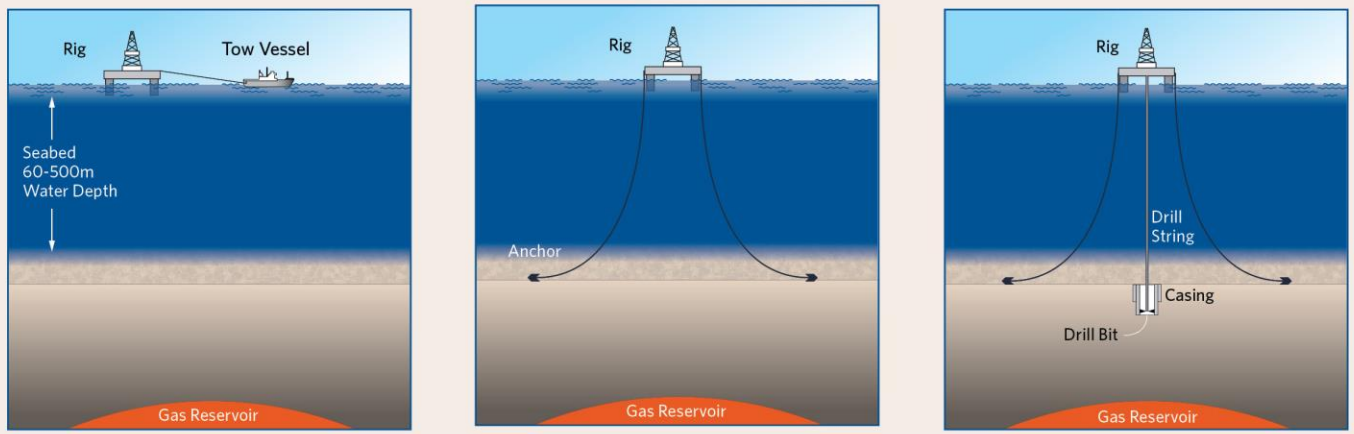
OFFSHORE GAS VICTORIA – DRILLING AND PLUG & ABANDONMENT

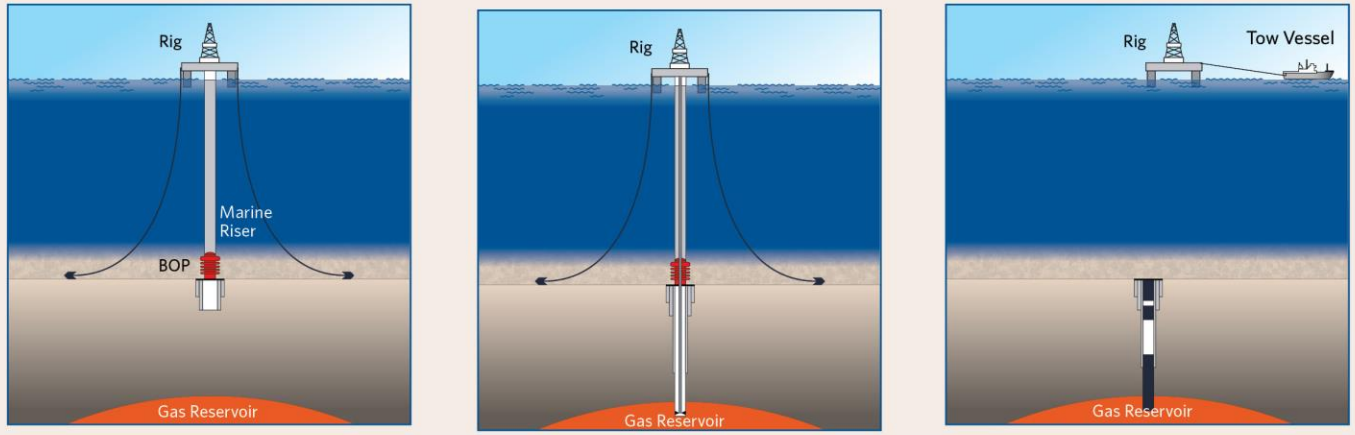
DRILLING ACTIVITIES & EQUIPMENT SUPPLY



1 Rig towed to site

2 Anchors laid on seabed (Drilled and cased)

3 Surface hole contructed (drilled and cased)



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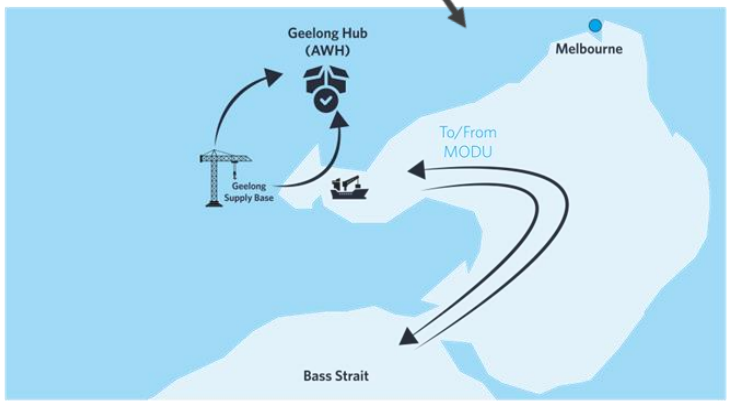

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OFFSHORE GAS VICTORIA – DRILLING AND PLUG & ABANDONMENT

P&A ACTIVITIES – Pre- Rig Arrival (June 2023)

Before

After

Before

After

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OFFSHORE GAS VICTORIA – DRILLING AND PLUG & ABANDONMENT

Activity photos

OFFSHORE GAS VICTORIA – DRILLING AND PLUG & ABANDONMENT

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- Highly skilled teams based in Melbourne and Adelaide on 24/7 rosters
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SPEAK WITH OUR SUBJECT MATTER EXPERTS

Brad Muir
Offshore Drilling Manager

Phil Wemyss
Lead Health, Safety, Environment and Risk Adviser

Candice Nayda
First Nations Engagement Manager

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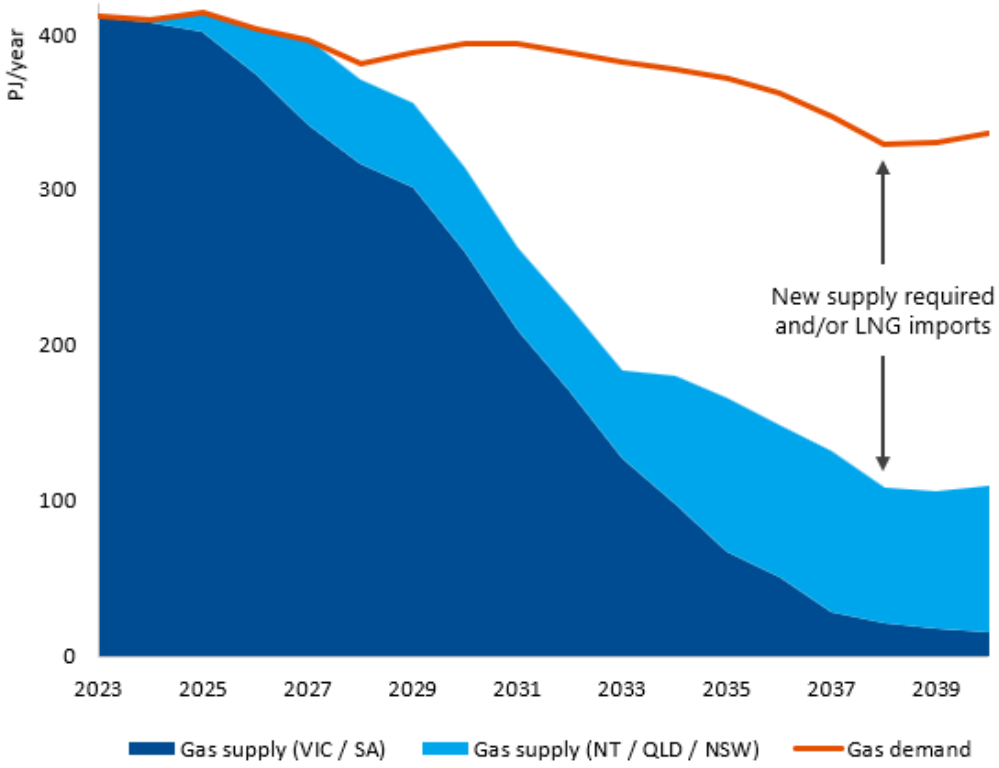
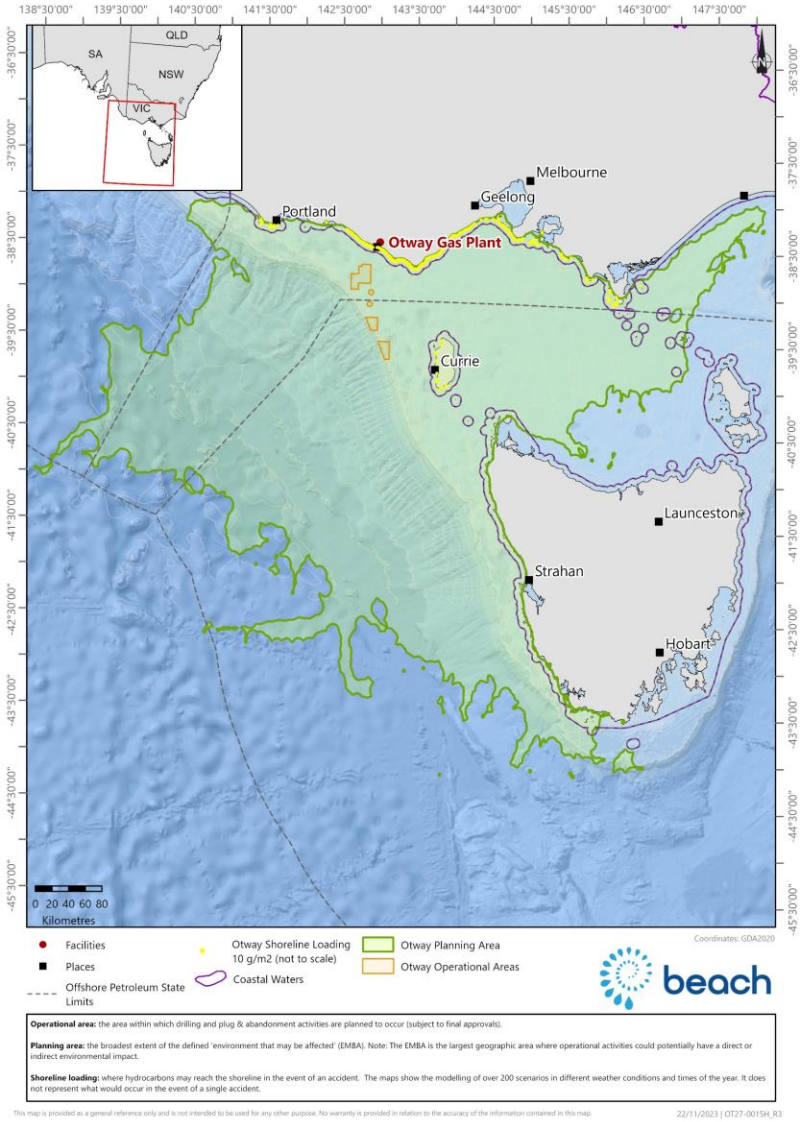
East Coast gas supply and demand, excluding LNG flows[1]



OFFSHORE GAS VICTORIA – DRILLING AND PLUG & ABANDONMENT

Otway planning area



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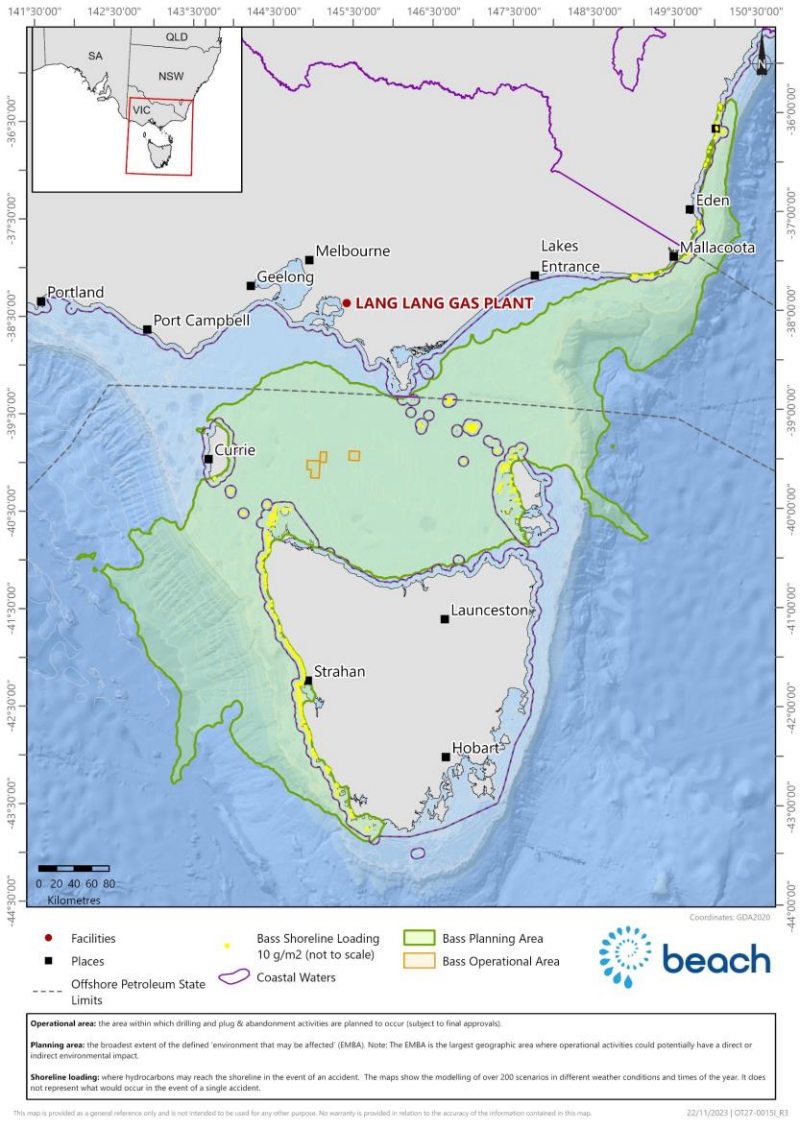

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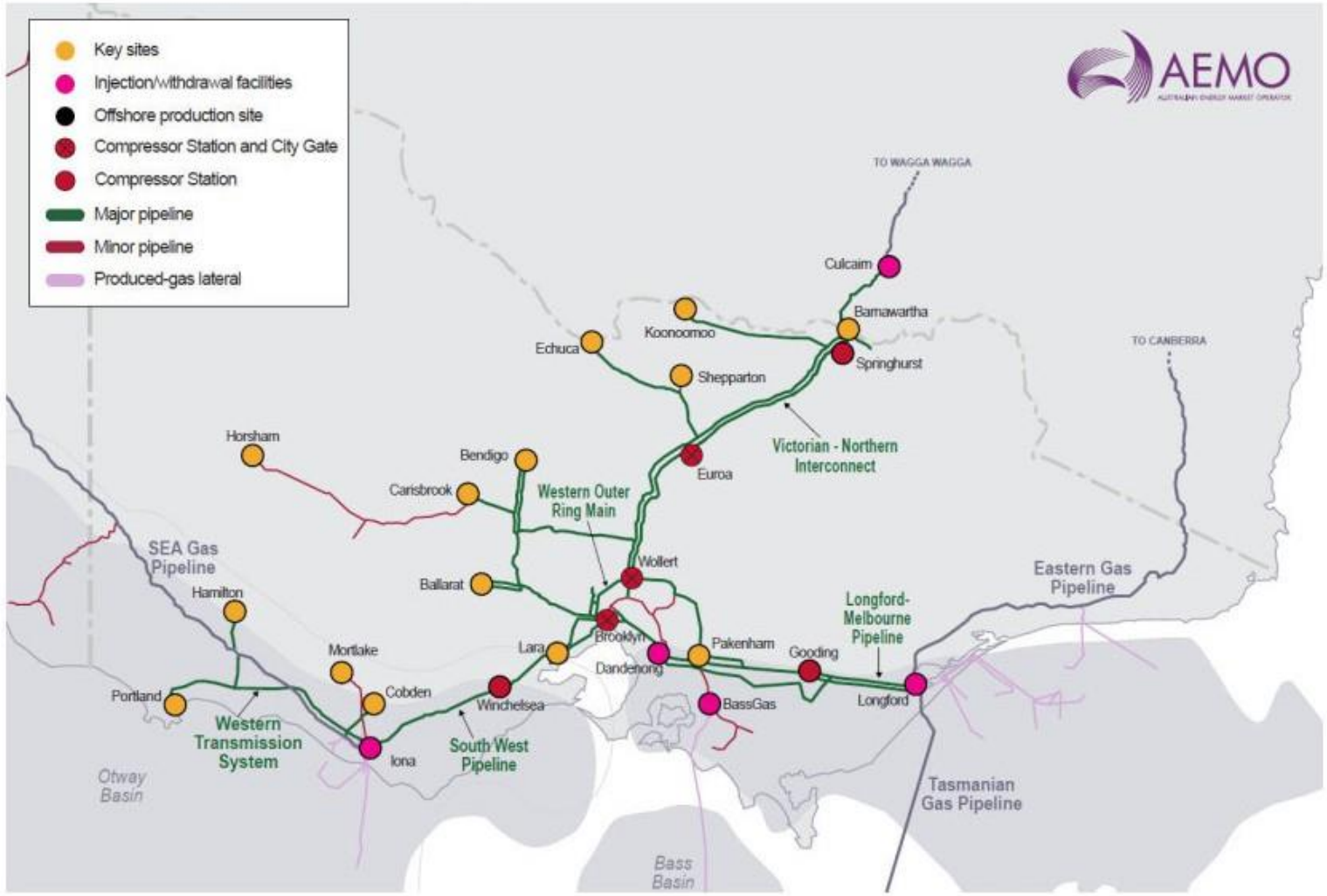
OFFSHORE GAS VICTORIA – DRILLING AND PLUG & ABANDONMENT

Gas infrastructure



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Offshore Gas Victoria Project

Drilling Q&A Webinar

29 NOVEMBER 2023

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OFFSHORE GAS VICTORIA – DRILLING Q&A

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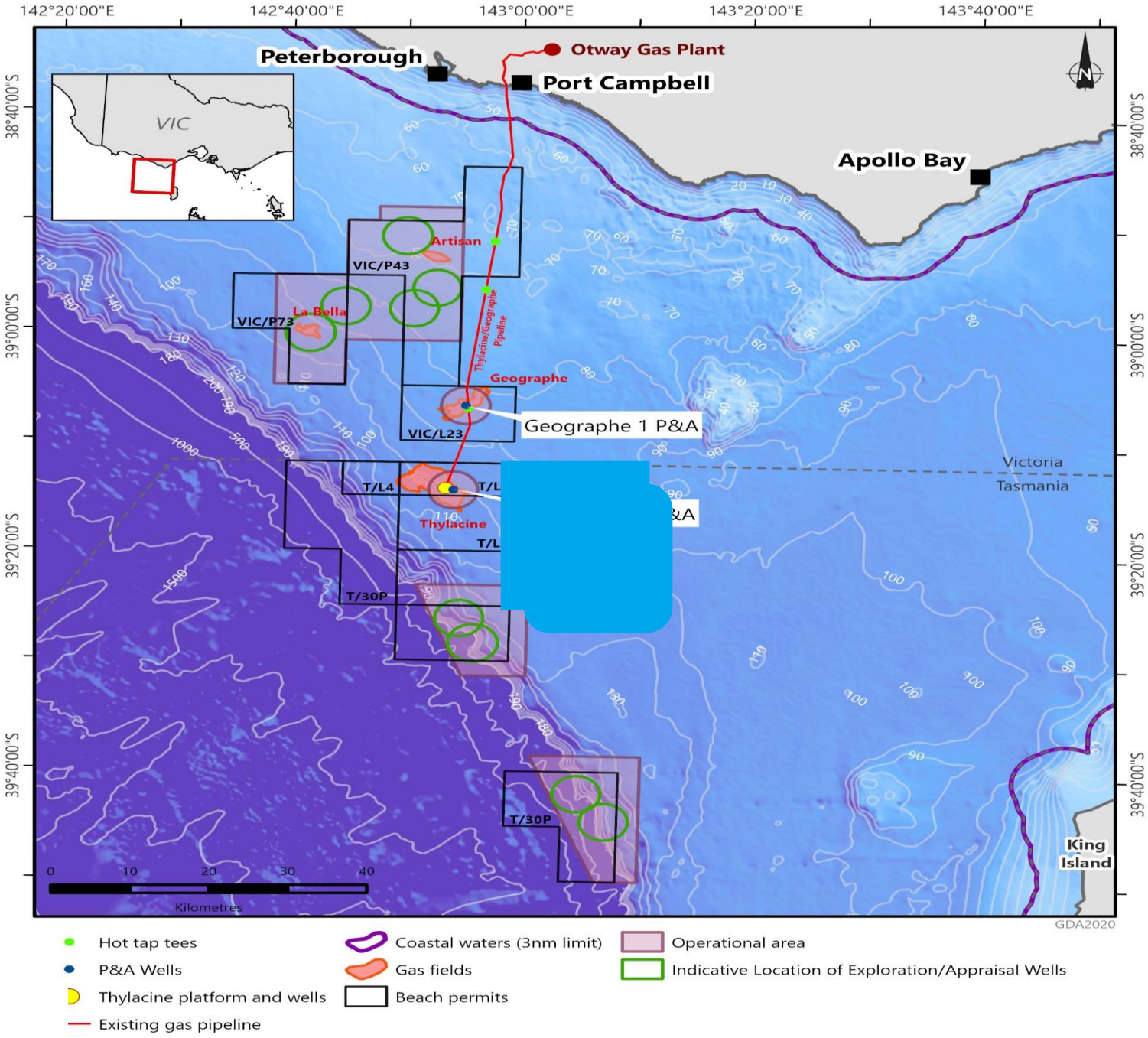

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OT23-0049_R6

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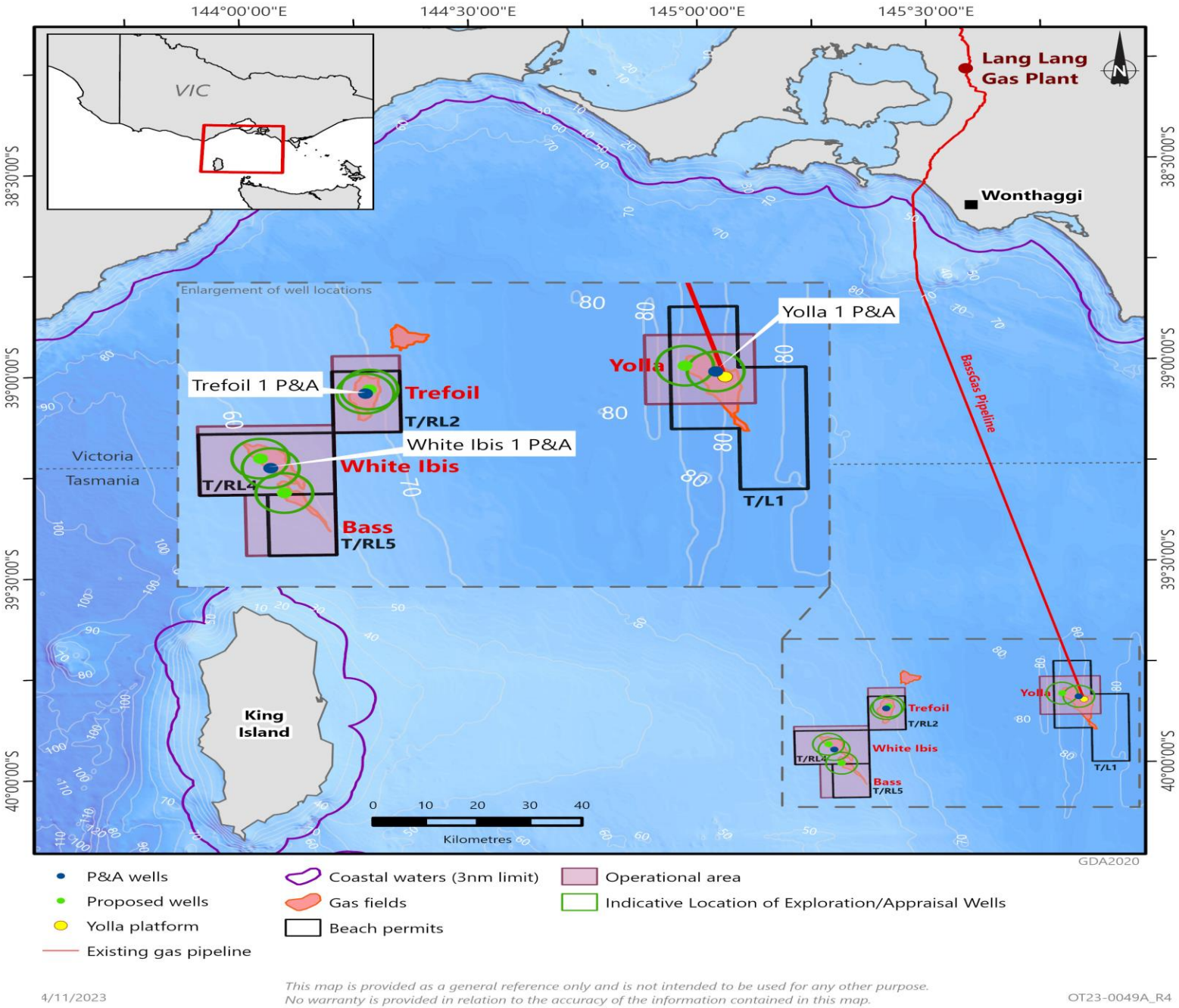
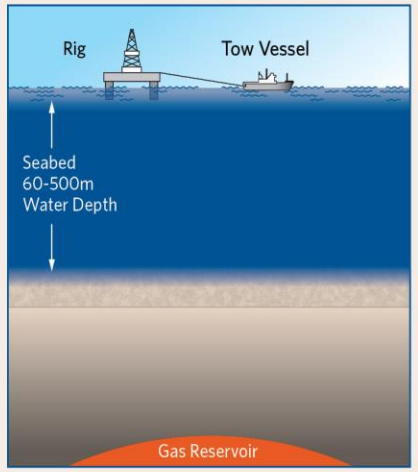
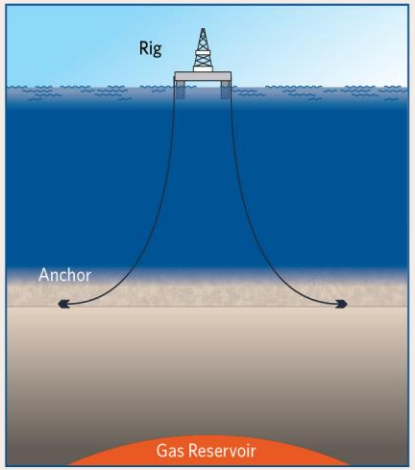


DRILLING ACTIVITIES & EQUIPMENT SUPPLY



1 Rig towed to site



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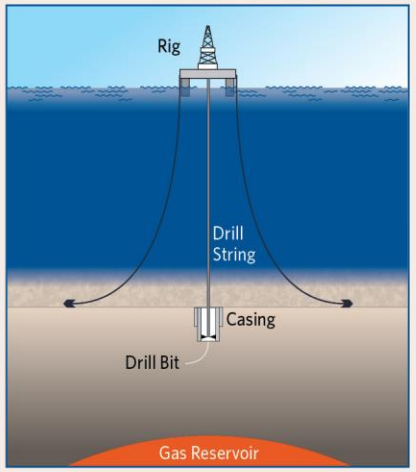

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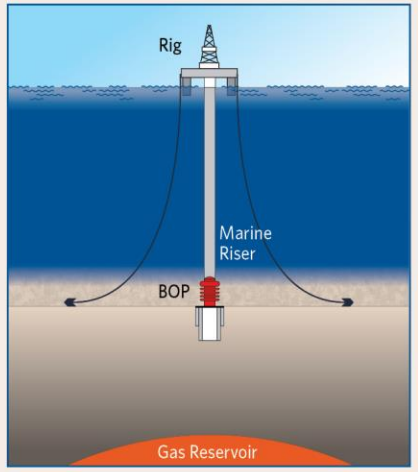

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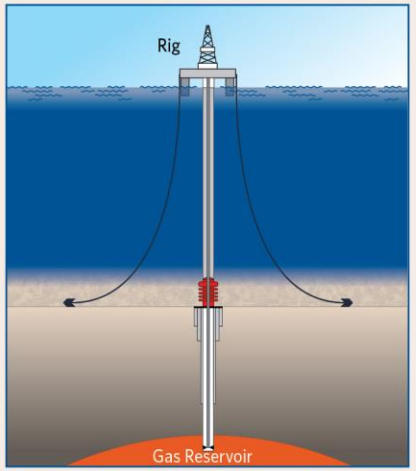

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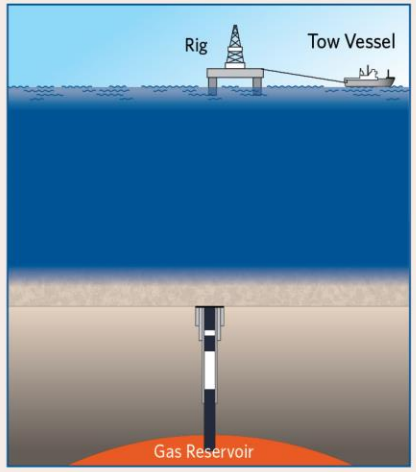
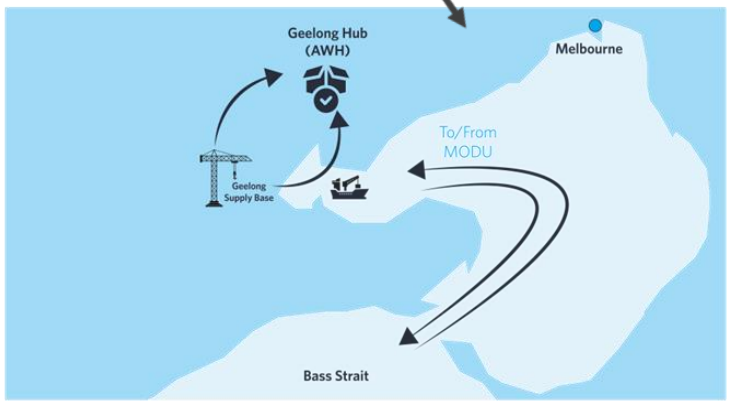


6 Well suspended or abandoned and rig towed away

GD23-0248

Equipment Supply Logistics



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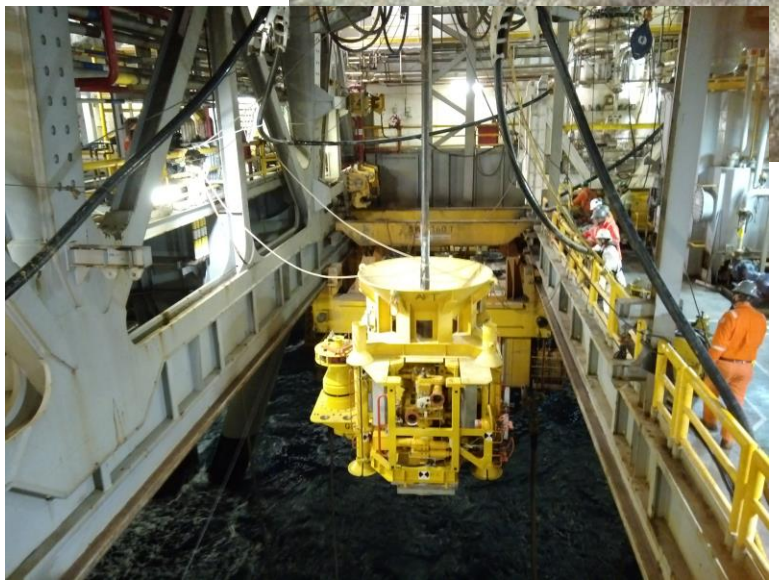

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Geoscientist

Candice Nayda
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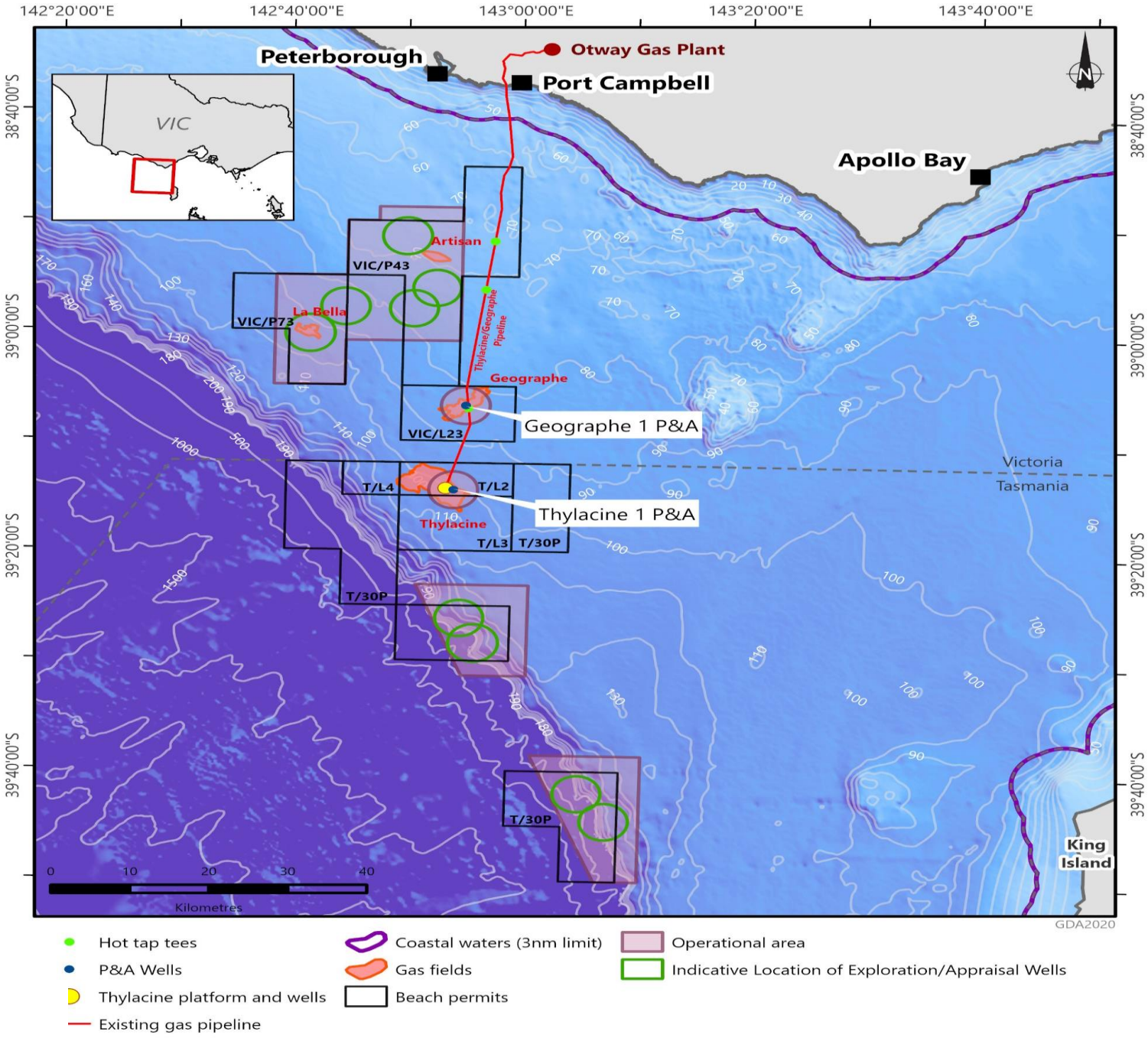

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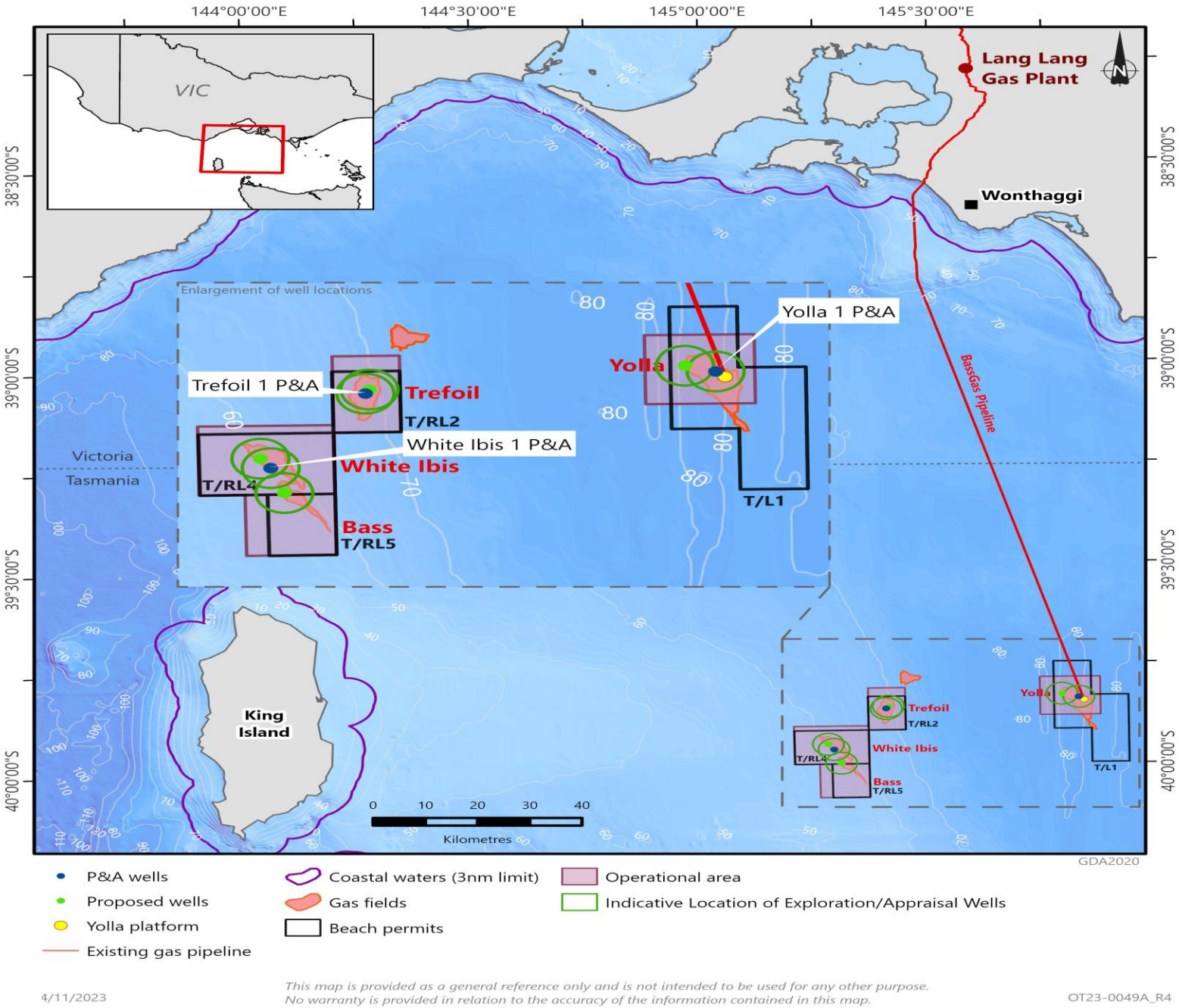

Plug and Abandonment Activities – Pre-Rig Arrival (June 2023)

Before

After

Before

After

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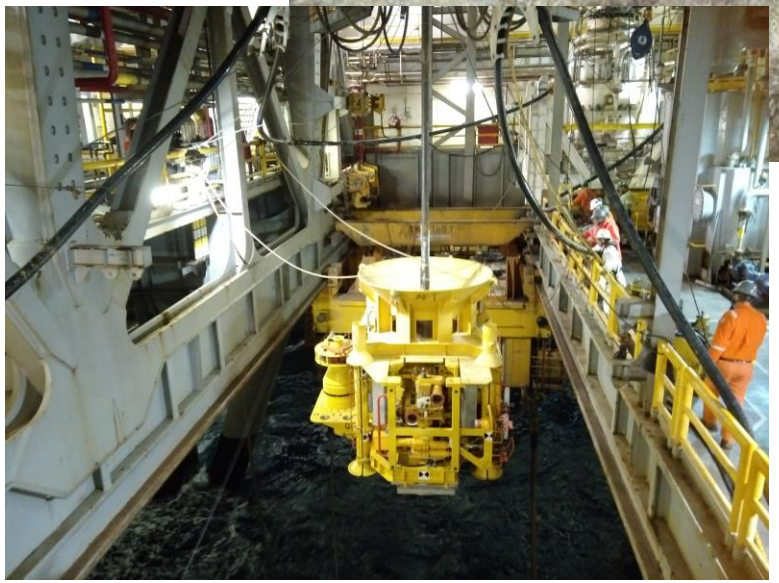

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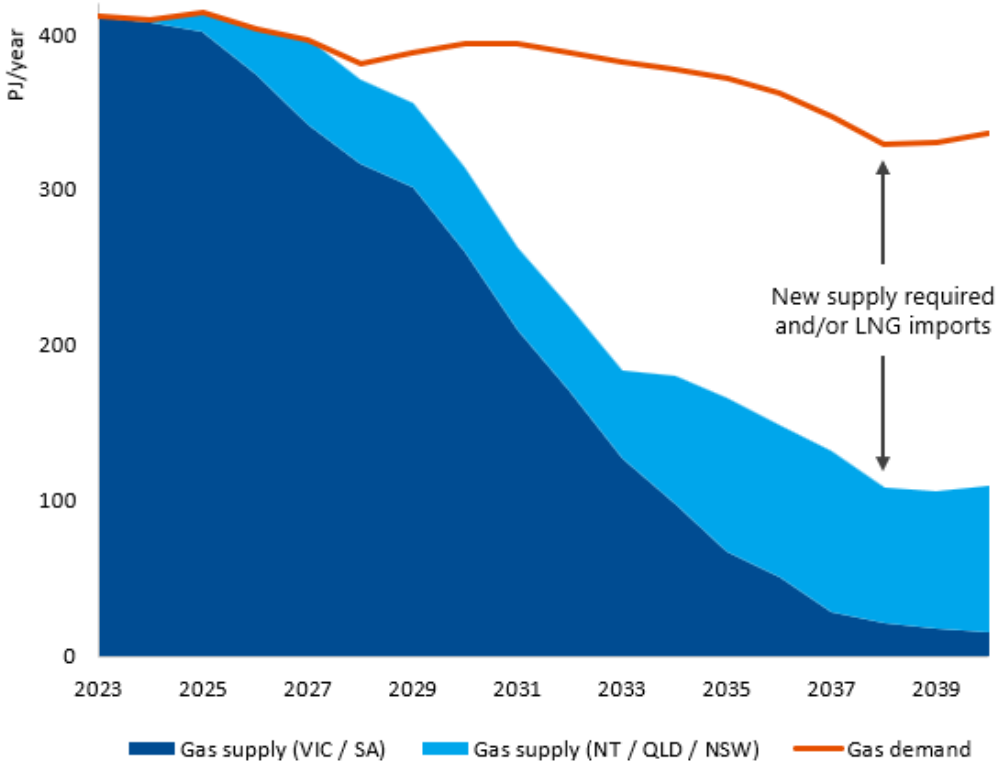

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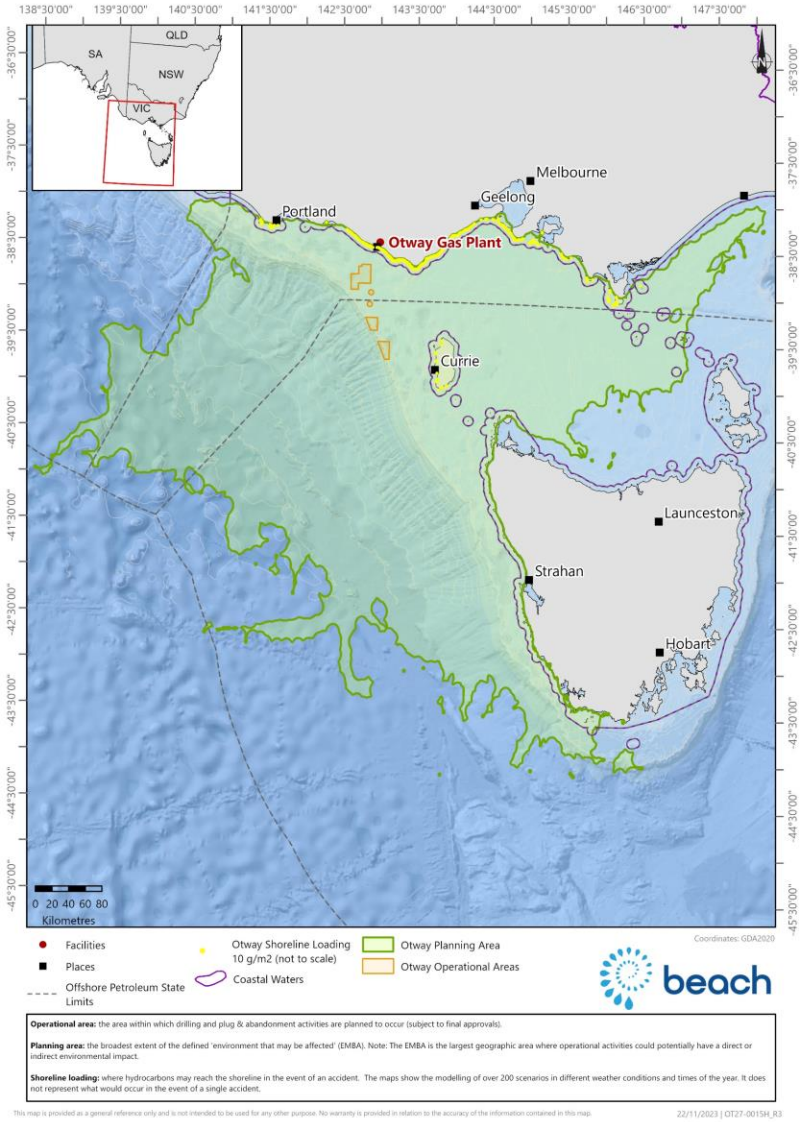

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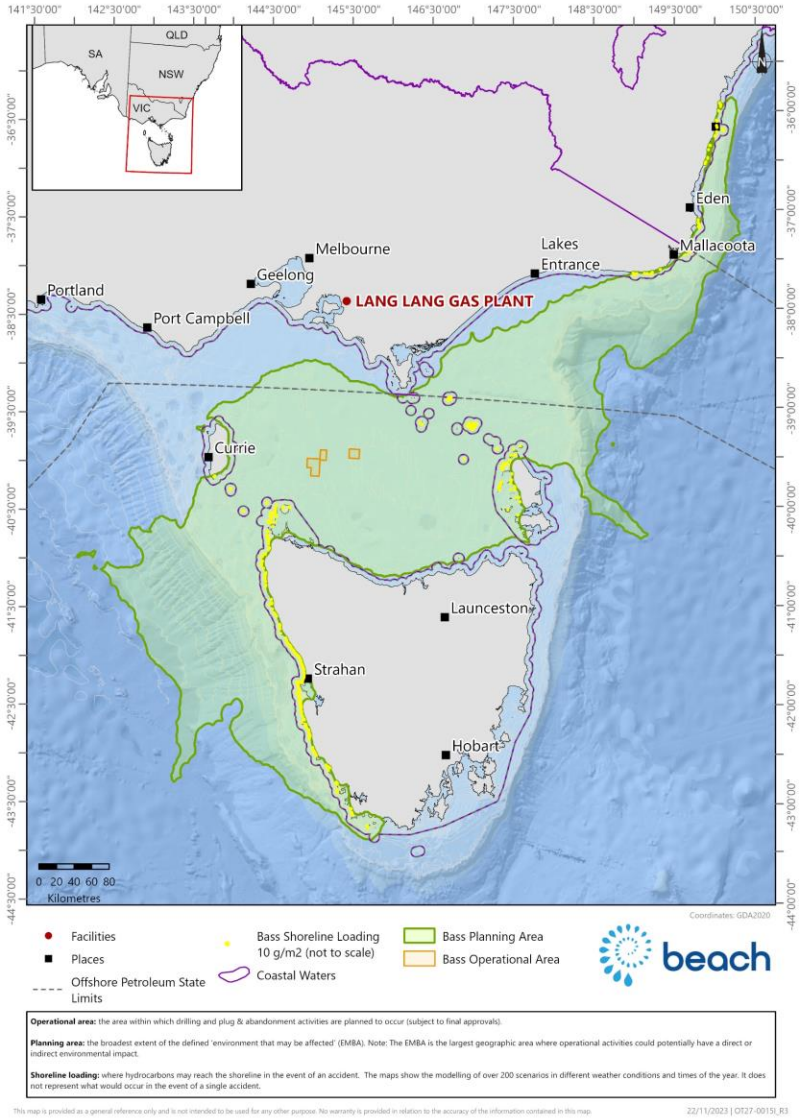

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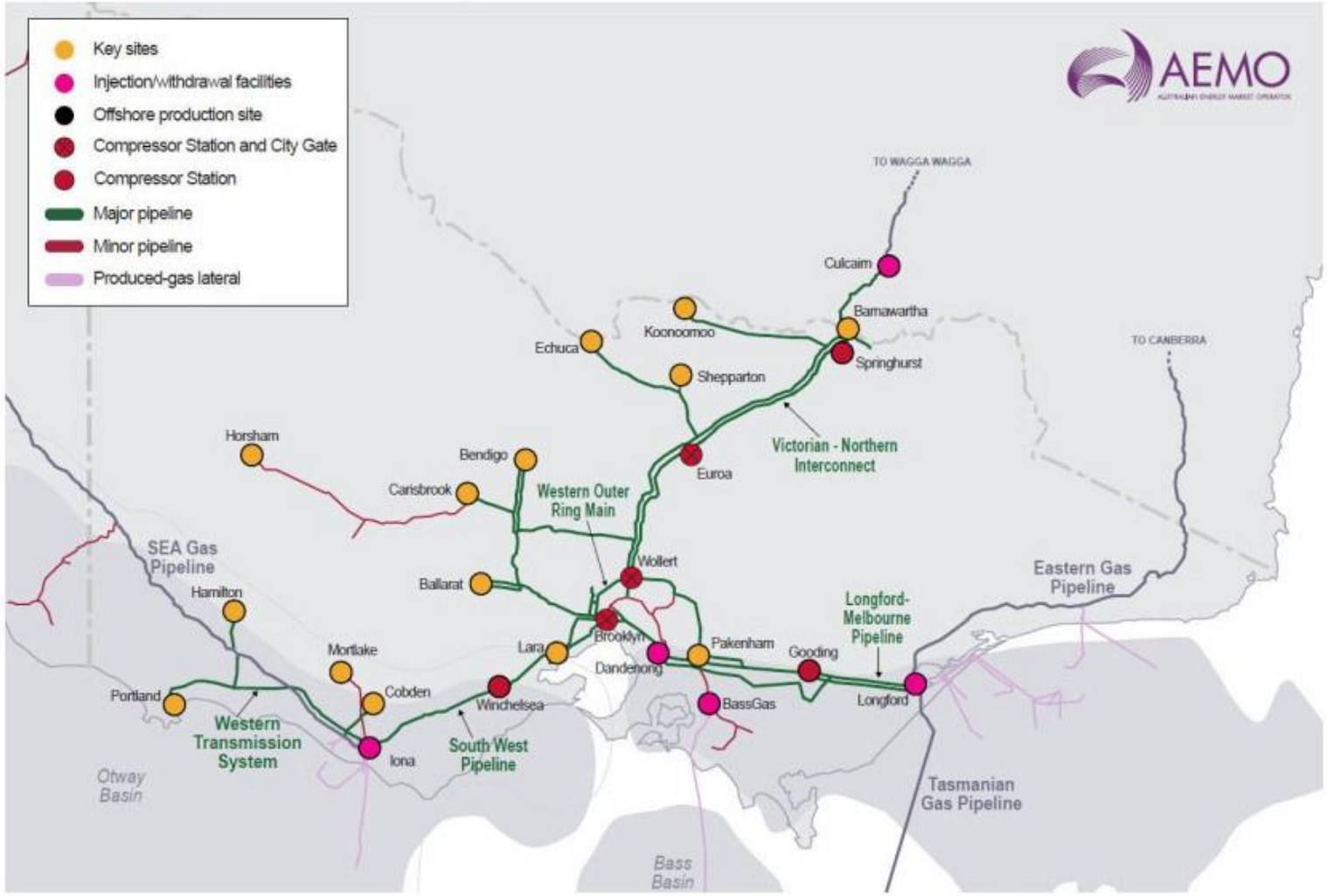

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SATURDAY 17TH FEBRUARY 2024

Gunditjimara and Beach Energy Offshore industry information session

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Acknowledgement of Country

We would like to respectfully acknowledge the Gunditjimara Peoples, who are the Traditional Custodians of the lands and waters on which we meet here today, we pay our respects to Elders both past and present for they hold the memories, the traditions, the culture and hopes of the Gunditjimara peoples.

Contents

Slide	Section	Speaker
1	Acknowledgment of Country	Candice Nayda
2	Introductions	All
3	Beach Energy projects	Neale Scott and Wayne Mothershaw
4	Protecting Sea Country	Candice Nayda & Phil Wemyss
5	Gunditjimara Sea Country cultural values	Candice Nayda
6	Good consultation and engagement	Candice Nayda

Offshore Gas Victoria

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Beach Energy – Who are we

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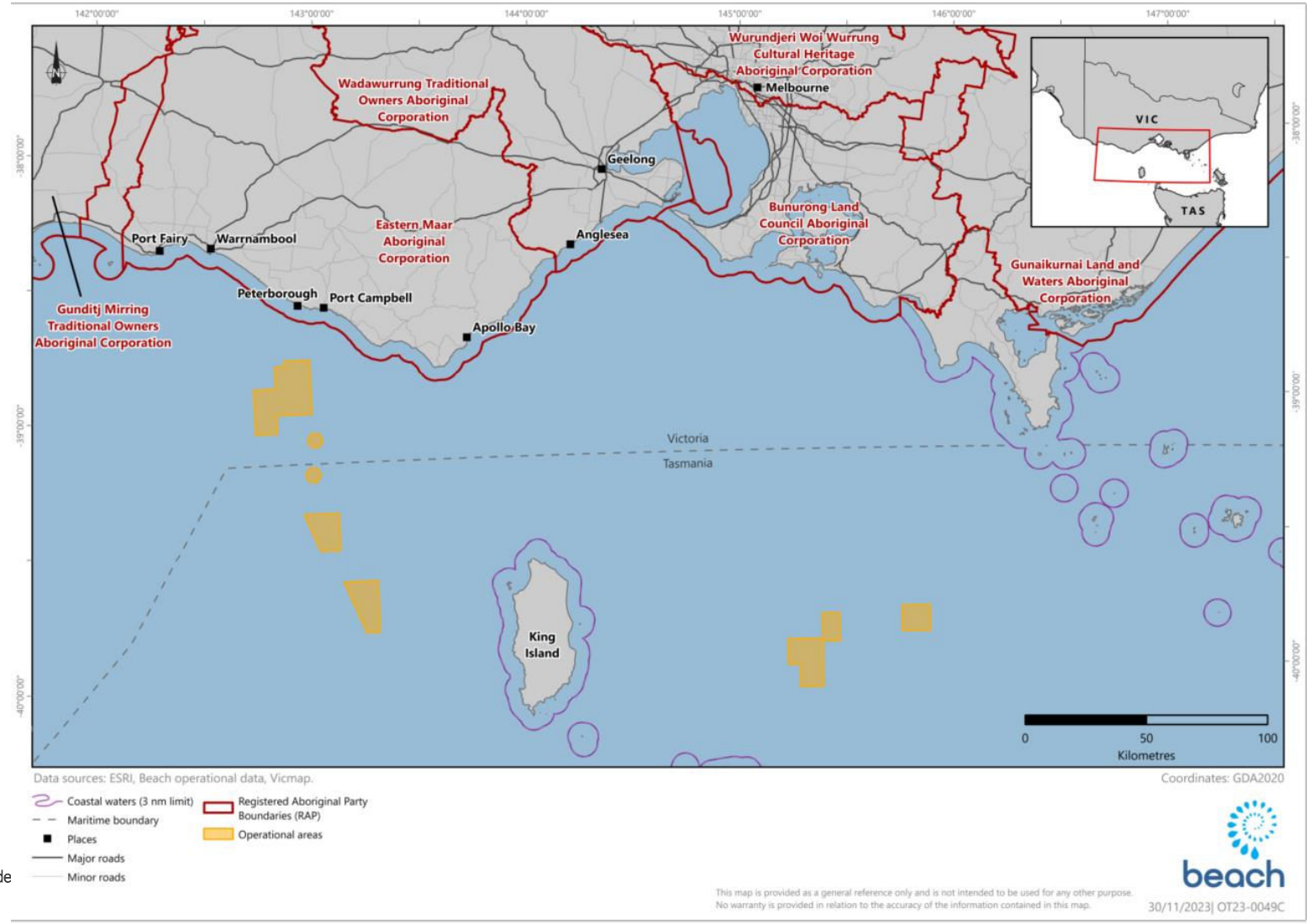
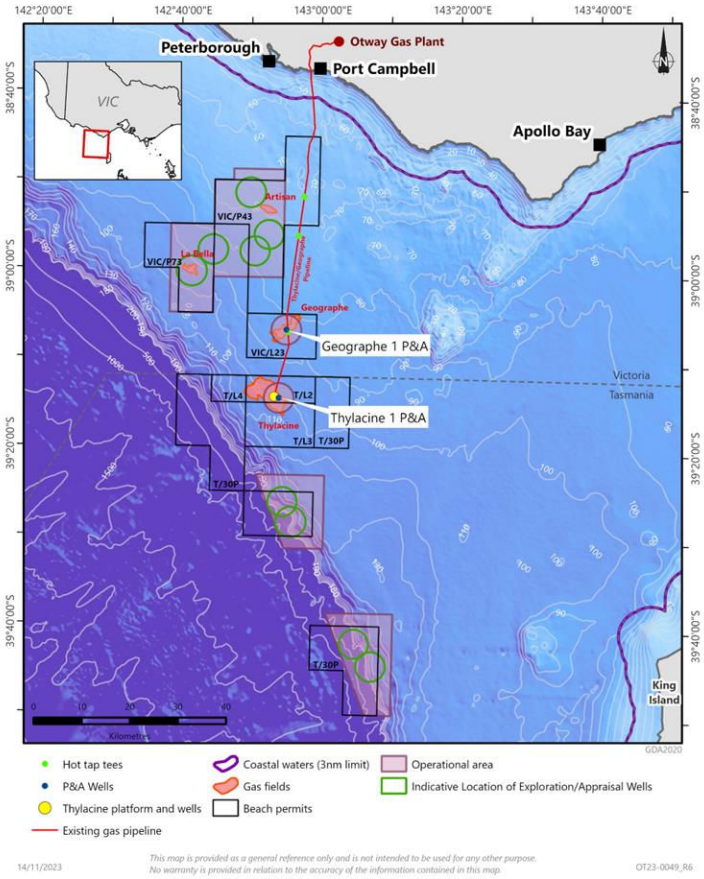


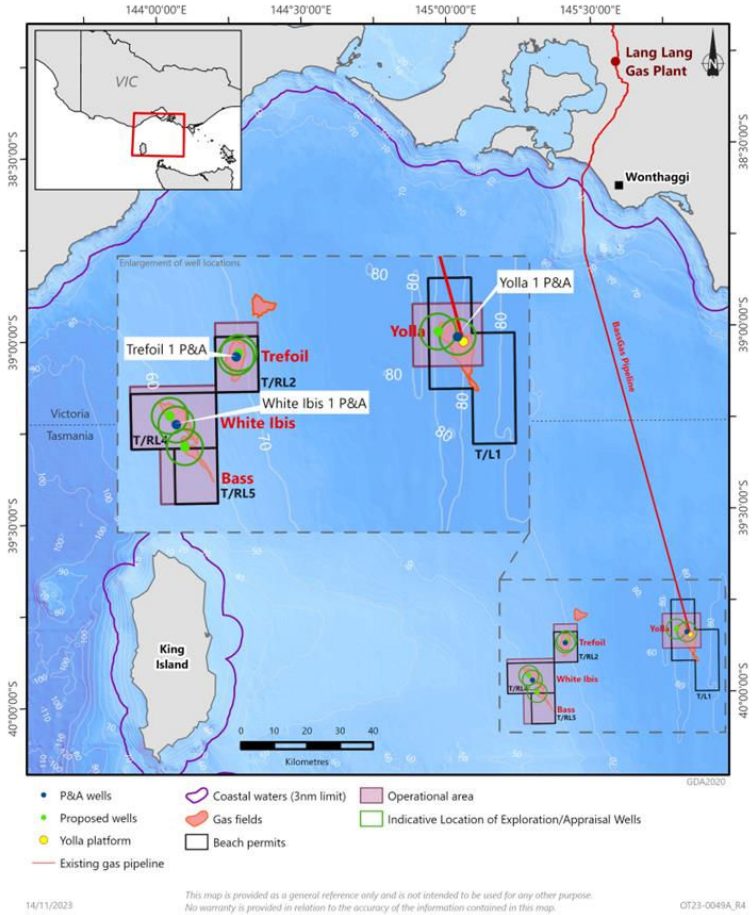
Beach Energy – Who are we

Otway Gas Plant



Beach Energy

Bass Gas plant



Beach Energy

Recent Activities

Otway Offshore Project 2019 - 2022

- Assessment of seabed locations (non seismic) in 2019
- Followed by drilling program from February 2021 to July 2022. One exploration well and 6 production wells drilled.
- Two wells at the existing Geographe subsea location and four close to the existing Thylacine Platform
- Connection of two new Thylacine wells to existing onshore to offshore pipeline.
- The final two Thylacine wells are proposed to be connected this year

OFFSHORE GAS VICTORIA – DRILLING AND PLUG & ABANDONMENT

OFFSHORE GAS VICTORIA PROJECT OVERVIEW

Seabed assessment	Removal of wells	Drilling of wells	Completing and connecting of wells
Assessment of suitable locations for drill rig and new seabed infrastructure to connect wells **Earliest start January 2024**	Removal of five suspended wells through a formal procedure called 'plug and abandonment' **Earliest start November 2024**	Up to 11 exploration / appraisal wells **Earliest start November 2024**	Completing successful wells, installing infrastructure, and connecting wells to existing pipelines **Earliest start mid-2025**

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Calico 3D Transition Zone Seismic

Calico 3D Seismic Survey

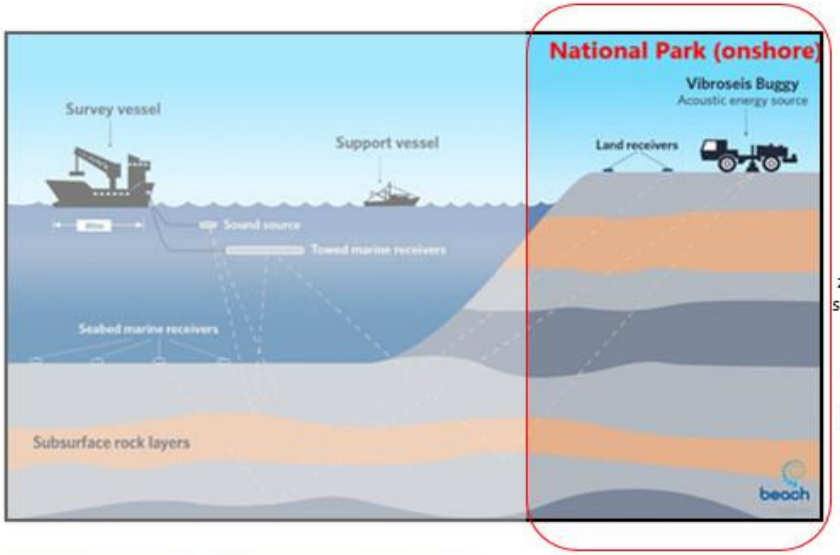


Figure 4: Schematic showing transition zone seismic survey (not to scale). Onshore component of survey highlighted.

Figure 5: Vibroseis buggy acquiring data adjacent to low-impact receiver node.

Figure 5a: *Indicative low-impact receiver node.*

Land Survey

Over four weeks:

- Vibroseis truck drives over land with nodes
- Truck lowers plate to create a 10 second-long vibration
- Vibration travels beneath surface, reflects energy back like echoes off geological layers beneath
- Returning energy is recorded as data

Over three weeks

- Land receivers collected
- Any vegetation/ground is rehabilitated if required

Over 12 months

- Data is processed, transferred and converted to 3D image

Calico Survey

Survey activities - land

Over four weeks

- Vibroseis truck drives over land with nodes
- Truck lowers plate to create a 10 second-long vibration
- Vibration travels beneath surface, reflects energy back like echoes off geological layers beneath
- Returning energy is recorded as data

Over three weeks

- Land receivers collected
- Any vegetation/ground is rehabilitated if required

Over 12 months

- Data is processed, transferred and converted to 3D image

Calico 3D Seismic Survey

Marine Survey:

Two components:

- Large survey vessel, approx. ~50 to 80m long
  - Tows air chambers that release bubbles into water
  - Creates acoustic energy
  - Travels through rock layers beneath seabed
  - Also tows marine receiver cables 5m-15m below surface
- Seabed marine receivers
  - Placed on seabed in grid pattern
  - Approx. 200m – 400m apart
  - Battery operated, fully-sealed units
  - Capture geotechnical information
  - Safe to operate in marine environment
  - Remote-controlled – programmed to float to surface when survey ends

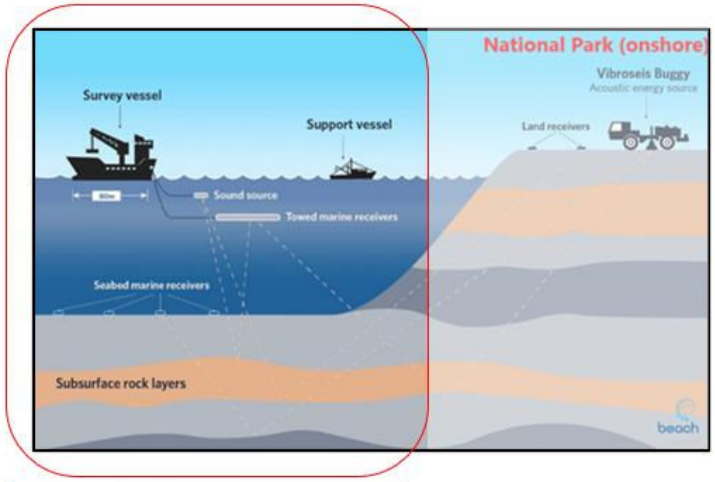


Figure 6: Schematic showing transition zone seismic survey (not to scale). Offshore component of survey highlighted

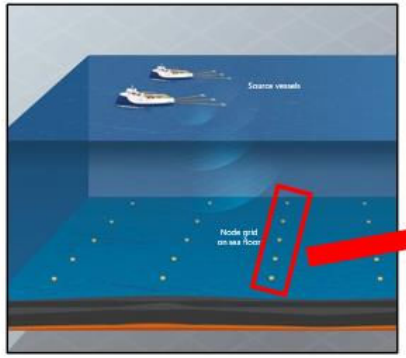


Figure 7: Schematic showing source vessels acquiring data adjacent to cable-free ocean bottom nodes.

Figure 7a: *Indicative ocean-bottom node options (dependent on final contracting)*

Gunditjimara Sea Country Cultural Values

Gunditjimara Sea Country Cultural values

What we have learnt

- All of Sea Country is significant
- Sea Country is interconnected

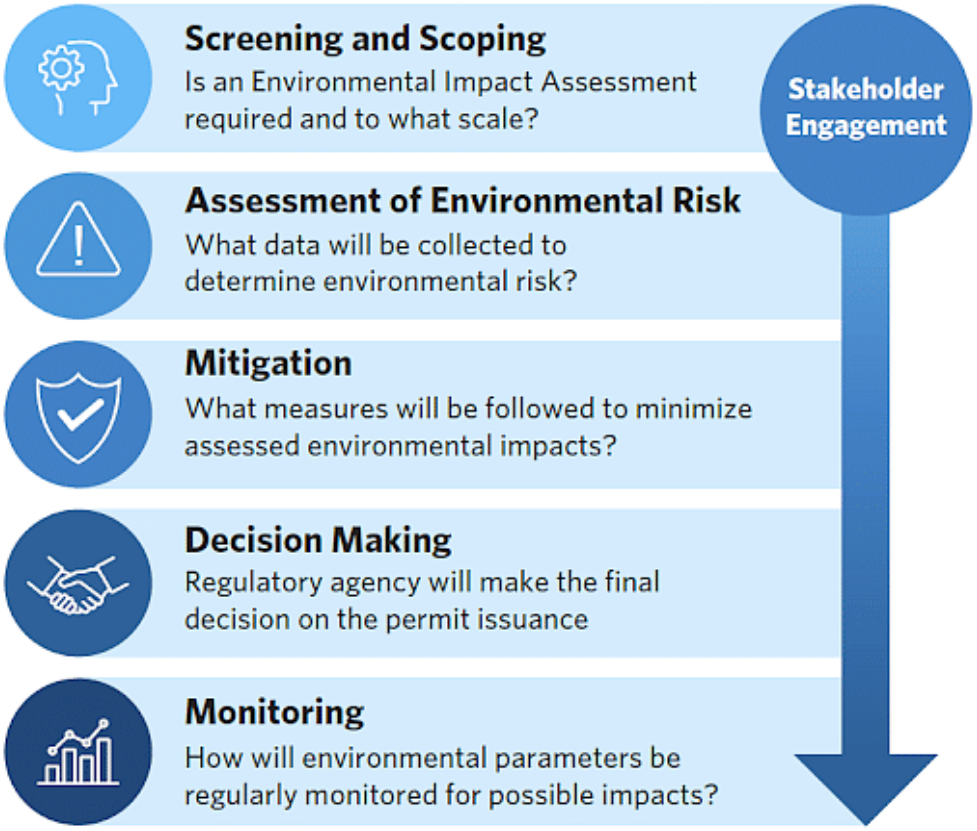
Protecting Sea Country

Key facts from recent drilling campaign:

- 13,500 Hours of marine mammal monitoring
- A total of 127 blue whales were observed within 3 km of the rig during the campaign. Average time a whales resided in the area was less than 27 mins in the observational area. A total of 219 blue whales were observed during the Project.
- Three (3) SRW were observed during the Project.

Protecting Sea Country

Environmental Impact Assessment



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Effective engagement with First Nations groups

Community Engagement Strategy

We strive to build acceptance, trust and respect in our communities through genuine engagement and social performance outcomes as shown in our community strategy framework.

Accepted
for providing energy security as we transition to a renewable energy future

Trusted
to operate safely, protect the environment and cultural sensitivities where we operate

Respected
through transparent engagement and giving back to our communities

- New projects
- Environment approvals
- Energy transition

- Indigenous relations
- Cultural heritage protection

- Landholder relations
- Land access and protection

- Volunteering
- Matched giving
- Fundraising

- Community investments
- Partnerships
- Research grants

- Community and Indigenous economic participation

Engagement

Social performance

Private and confidential – not for distribution

Indigenous engagement framework

Our cultural heritage engagement framework recognises the interconnectedness of cultural heritage, respectful relationships, community investment and economic participation.

Cultural heritage

- Conduct pre-work cultural impact assessments, plans, and procedures to ensure ongoing protection
- Provide cultural awareness training
- Create a culturally safe workplace

Respectful relationships

- Engage meaningfully to explain our activities, understand concerns and identify impacts and mitigations
- Develop opportunities for capacity building and self determination

Community investment

- Develop initiatives that intersect Beach and First Nations Peoples, iwi and hapū objectives

Economic participation

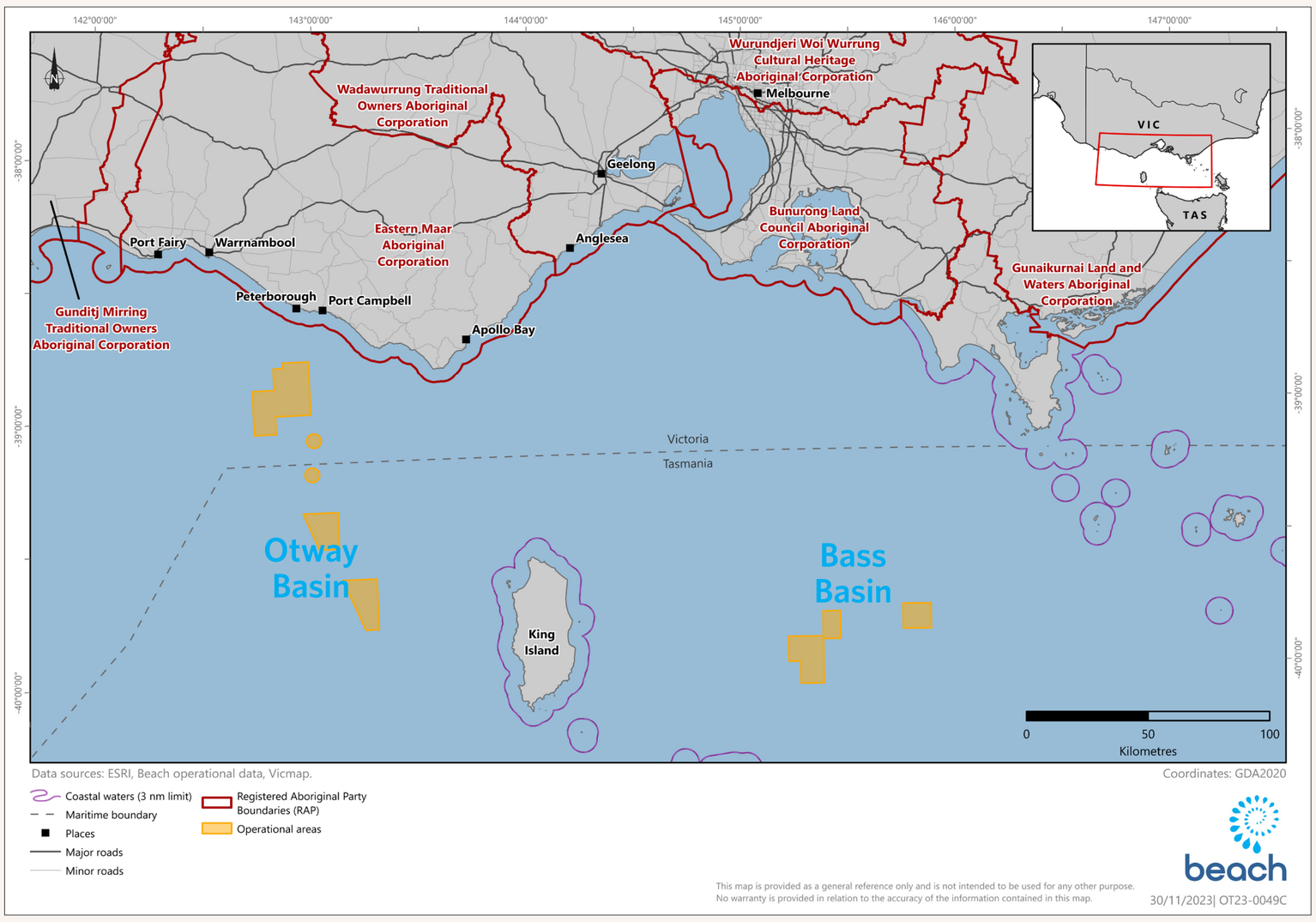
- Foster equity in employment
- Facilitate supply chain opportunities

Private and confidential – not for distribution

Otway Gas Victoria - Locations

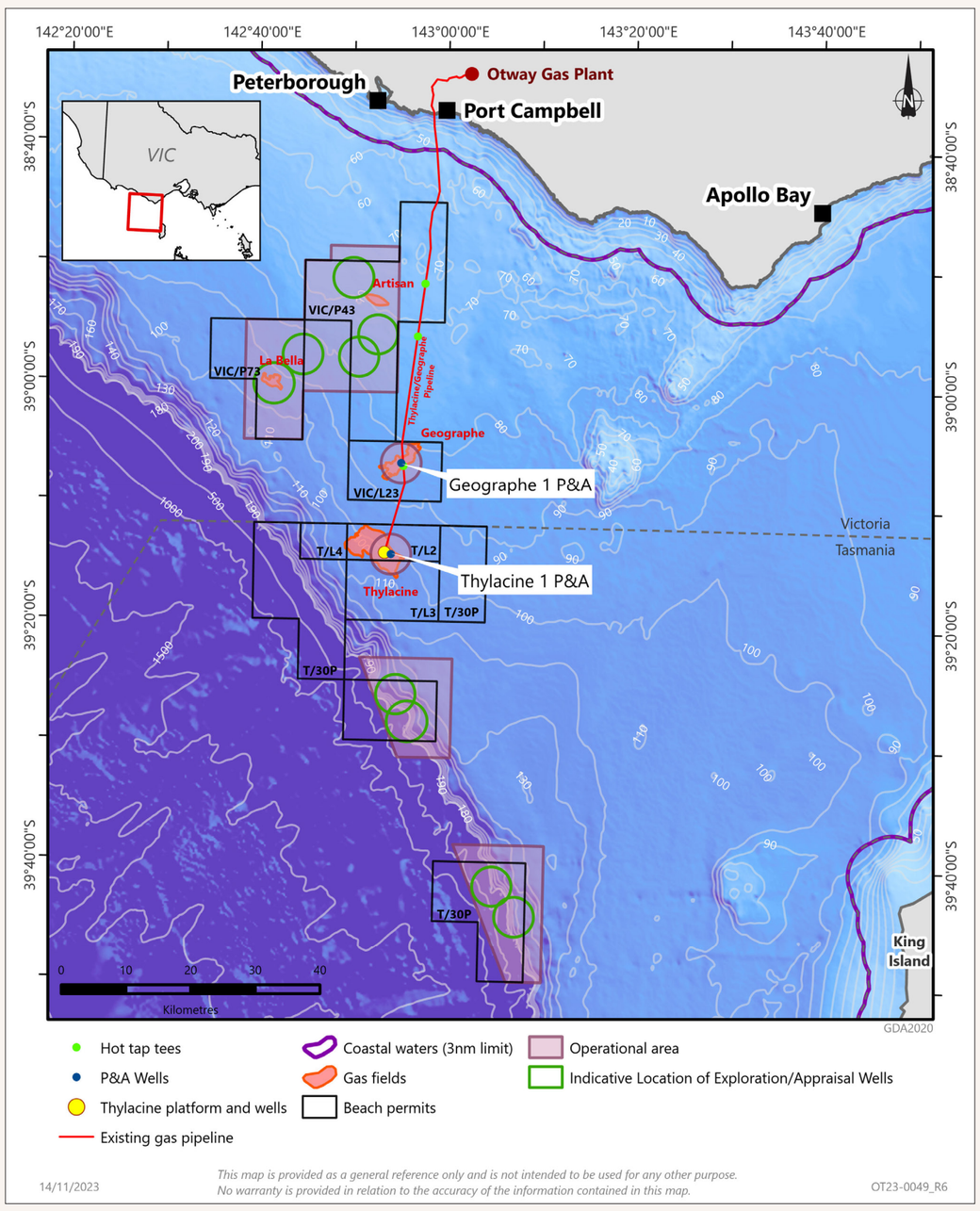
The orange areas represent the places where Beach is able to extract gas when required permissions are in place. These are called our "operated permits".

The two main regions are both located in Bass Strait. The first is in Western Victoria (Otway Basin), and the second to the south east of Melbourne (Bass Basin).



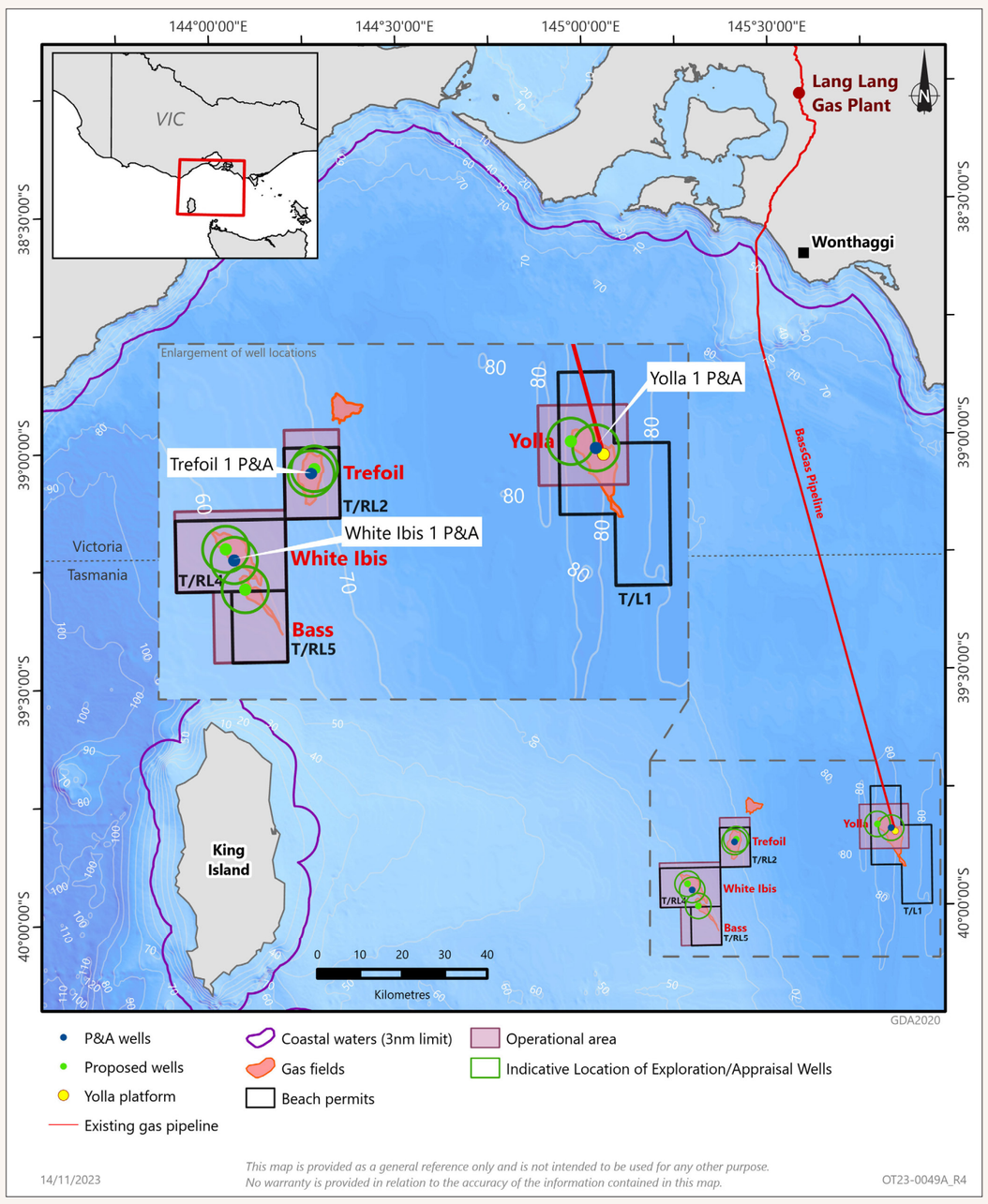
Otway Basin

This map shows the locations of the proposed offshore Otway Basin activities.



Bass Basin

This map shows the locations of the proposed offshore Bass Basin activities.



The black squares are **our permits**.

The red line is **our pipeline** and goes back to our onshore gas plants; Otway and Lang Lang.

The green circles indicate where we are **planning to drill** for gas in the future.

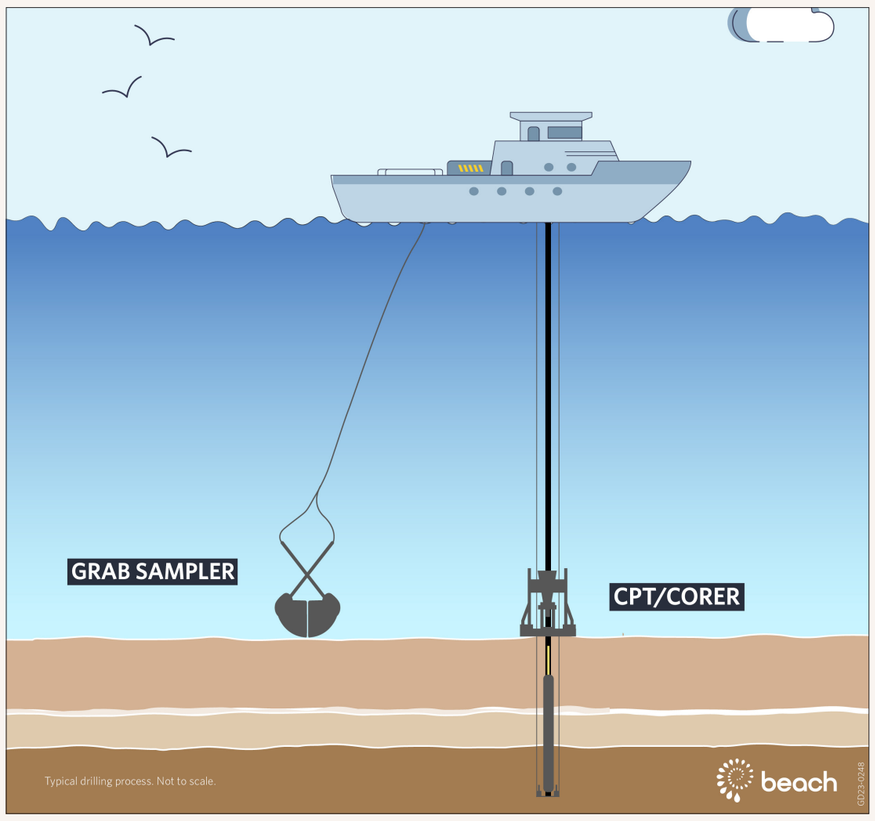
Otway Gas Victoria - Stages

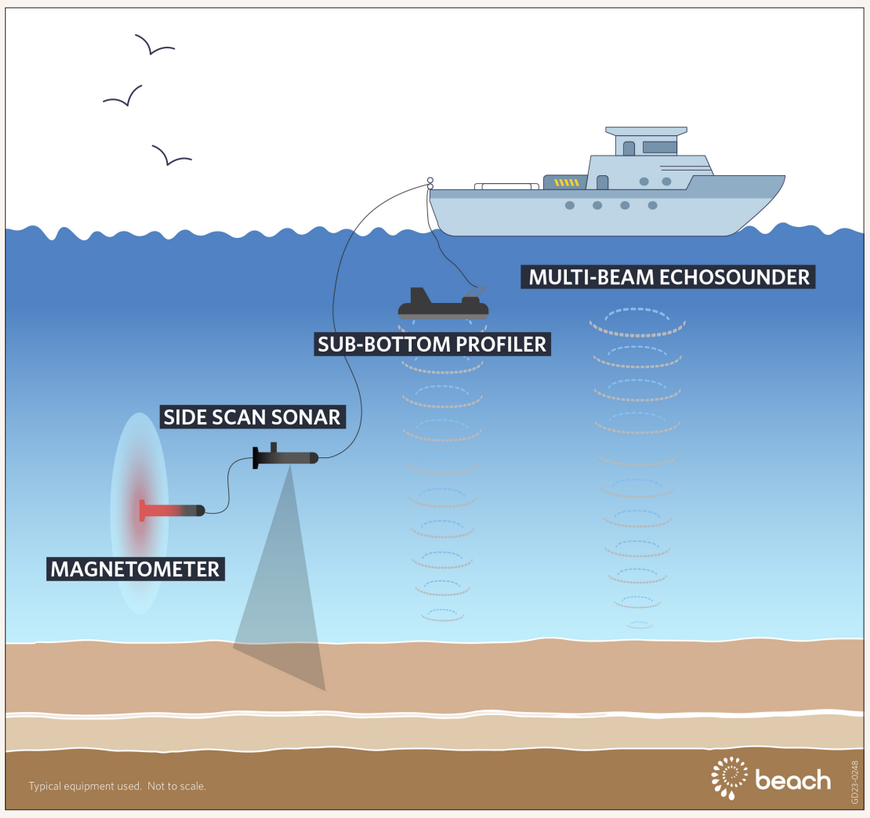
Seabed Assessments	Removal of old wells	Drilling of wells	Completing and connecting of wells
Earliest start January 2024	Earliest start November 2024	Earliest start November 2024	Earliest start mid 2025

Seabed assessment

Seabed assessments (non-seismic) are carried out to determine suitable seabed locations for drilling operations and installation of infrastructure to connect new production wells to the existing pipeline.

The assessments are conducted using geotechnical and geophysical activities over around 20 days.



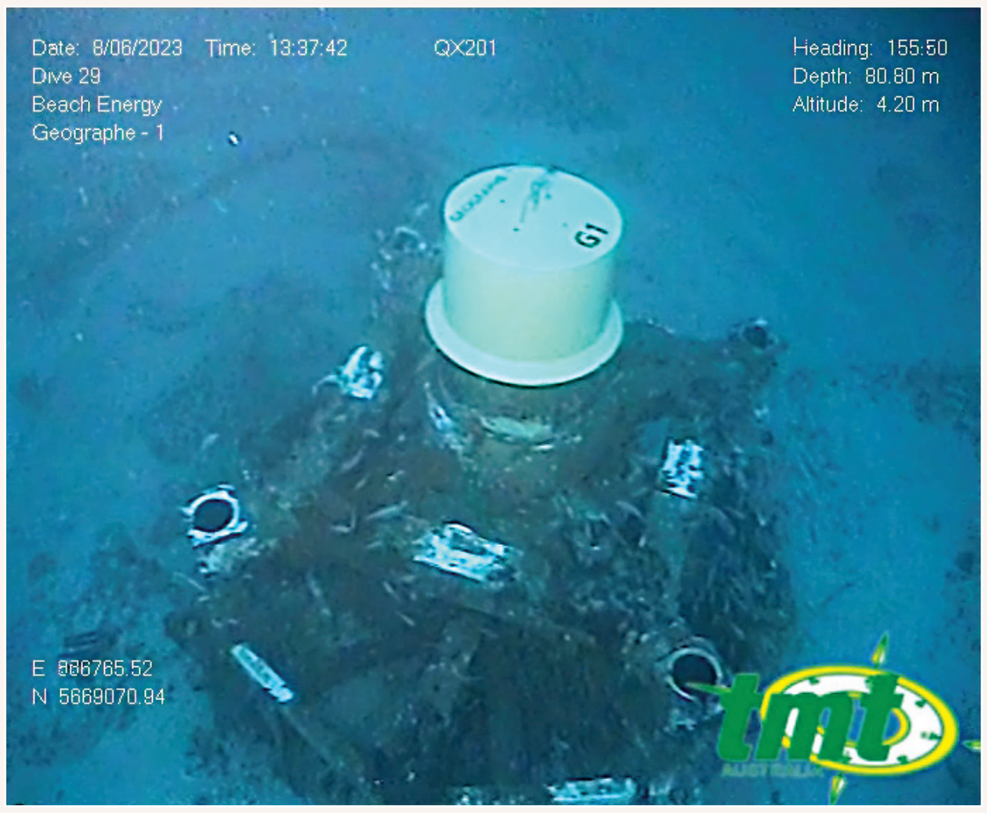


Methods of seabed assessment

Removal of old wells

As part of our activities, we plan to remove old wells (a process called "plug and abandonment"). This activity is done to wells that are no longer producing, so they can be made safe indefinitely.

The same drilling rig that undertakes our offshore drilling carries out these activities.



Before and after photos of plug and abandon activities

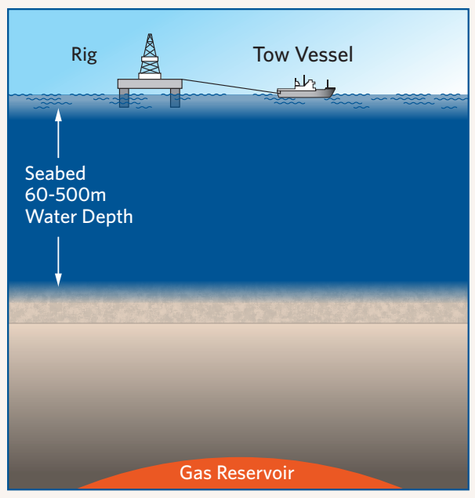
Otway Gas Victoria - Stages

Seabed Assessments	Removal of old wells	Drilling of wells	Completing and connecting of wells
Earliest start January 2024	Earliest start November 2024	Earliest start November 2024	Earliest start mid 2025

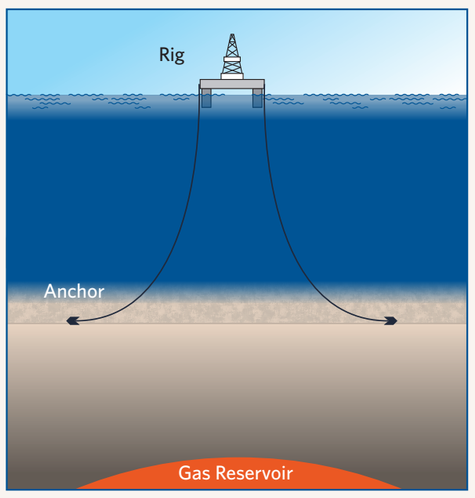
Drilling of wells

Up to 11 wells would be drilled with exact location and timing to be determined. Each well takes up to 50 days to complete.

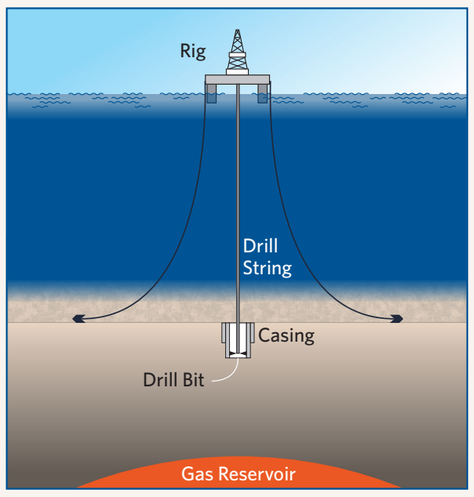
Beach has contracted the Ocean Equinox offshore drilling rig to undertake the activity.



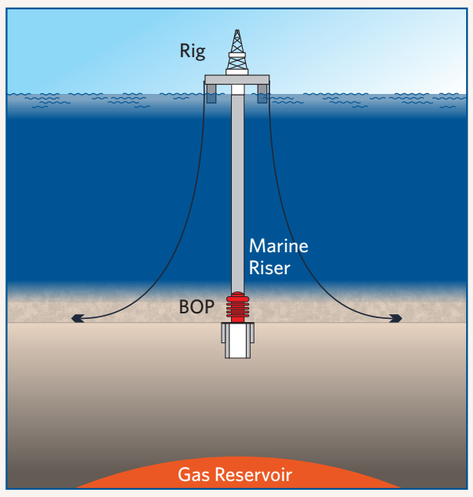
1 Rig towed to site



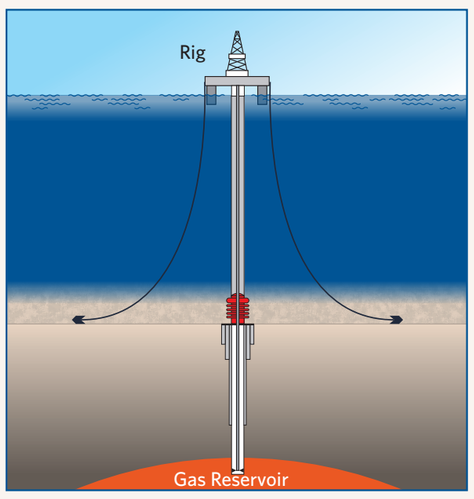
2 Anchors laid on seabed (Drilled and cased)



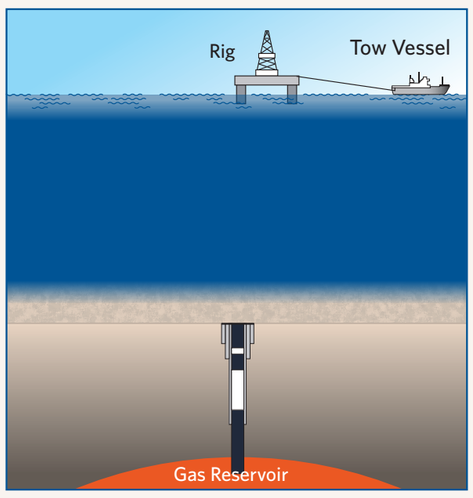
3 Surface hole contructed (drilled and cased)



4 Marine Riser and Blow Out Preventers (BOP) run to seabed



5 Drill and construct well to gas reservoir



6 Well suspended or abandoned and rig towed away

Completing and connecting of wells

Should drilling be successful and new gas discovered, wells would be completed and connected to our existing infrastructure.

In the Otway Basin, they would be tied into the offshore Thylacine platform, which is connected by pipeline to the onshore Otway Gas Plant. In the Bass Basin, they would be tied back to the Yolla platform, which is connected to the Lang Lang Gas Plant.

Thylacine offshore platform and support vessel

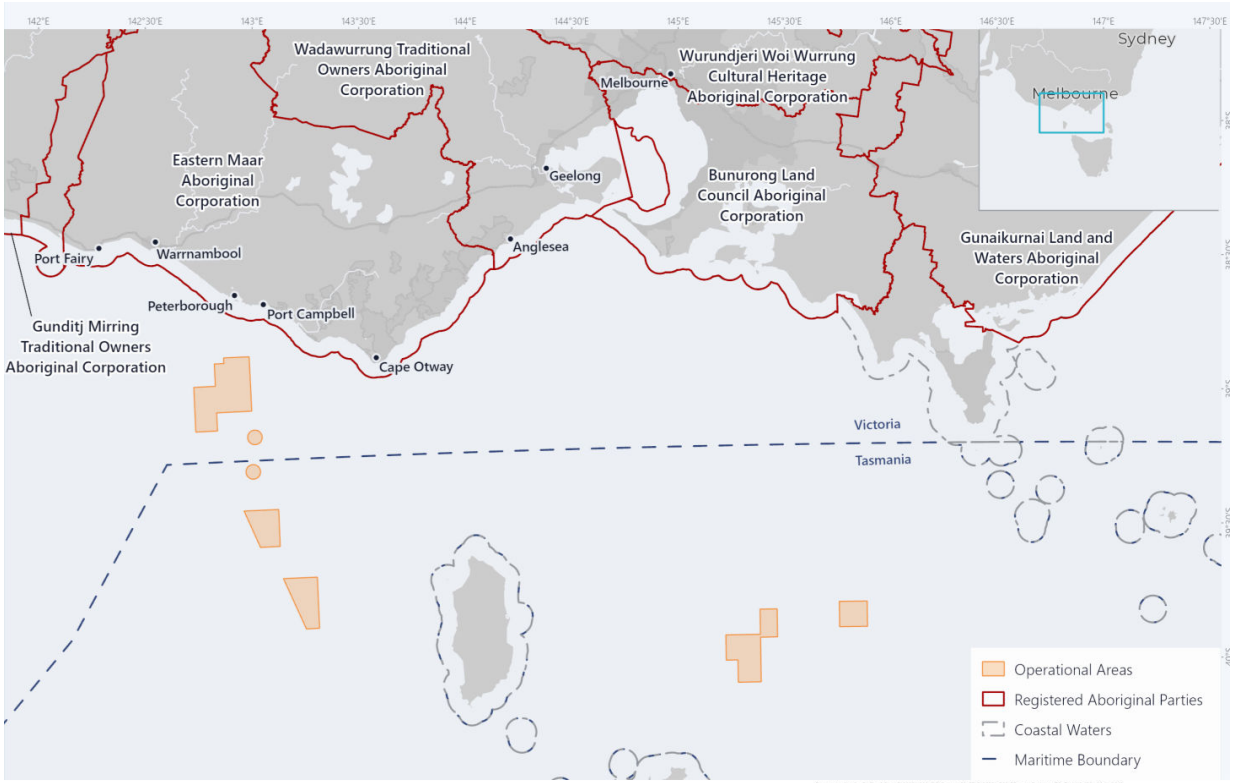
Yolla offshore platform

Consultation for Offshore Environmental Plans

Under the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (the Environment Regulations) Regulation 11A consultation is required to ensure that authorities, persons or organisations who are potentially affected by activities are consulted, and their input considered in the development of an environmental plan, which will be submitted to the industry regulator, NOPSEMA. Consultation and feedback with anyone whose functions, interests or activities may be affected by the project activities is an important part of developing Environment Plans.

First Nations groups may request that the information they provide during consultation not be published in the Environment Plan.

Beach will consider all feedback, including any concerns or objections and will explore measures to reduce any impacts and risks.



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Division

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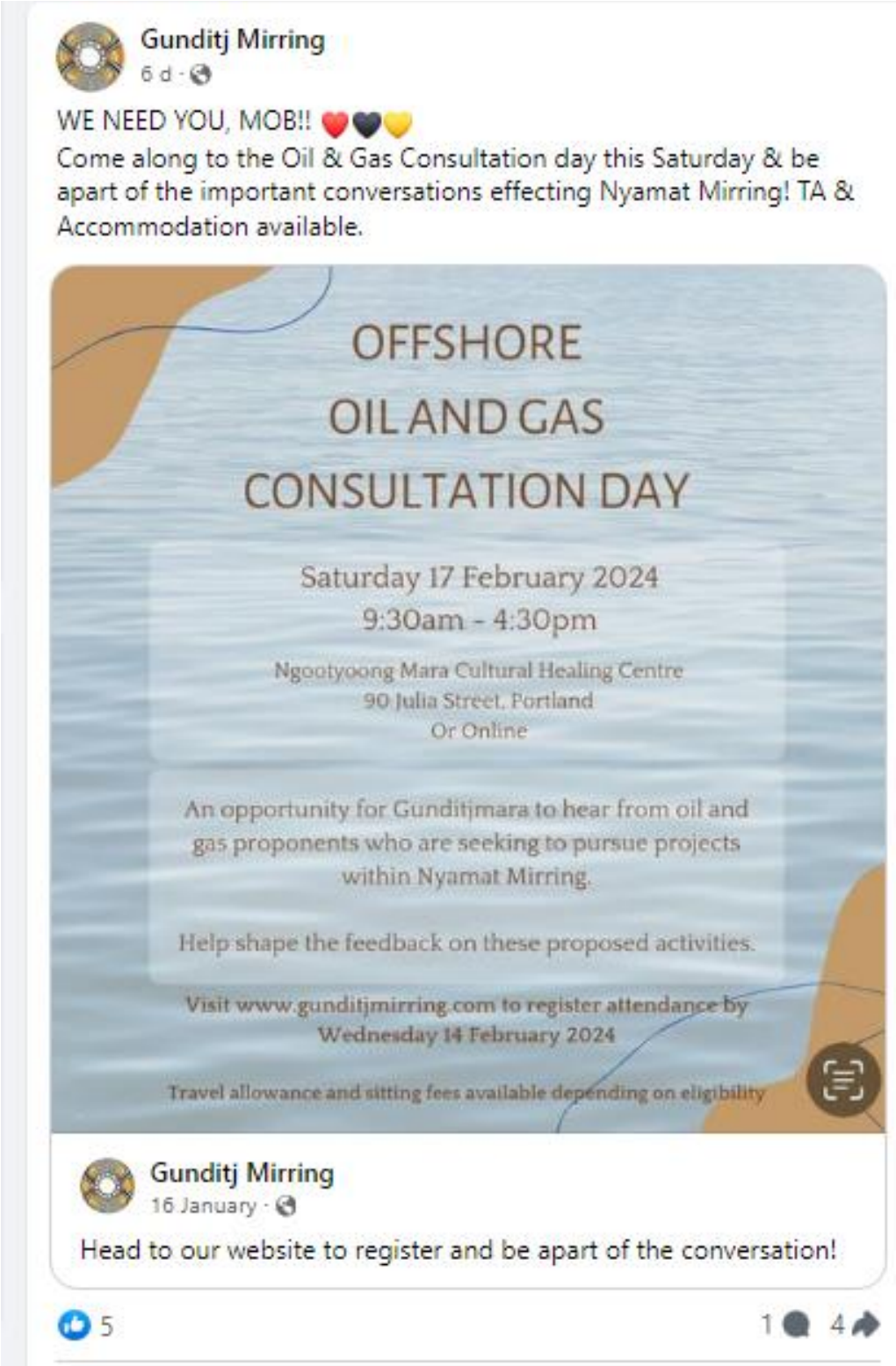
beach

Gunditj Mirring Facebook page advertisements for Industry proponent day

Advertised on Gunditj Mirring Facebook page 13th Feb 2024



Advertised on Gunditj Mirring Facebook page 6th Feb 2024

Advertised on Gunditj Mirring Facebook page 16th January 2024

Appendix D Fair Ocean Access Information Sheet

Fair Ocean Access

Minimising fishing impacts from offshore operations

beach

Information Sheet | May 2021

Introduction

Licenced commercial fishers and petroleum title holders have lawful rights and obligations to carry out their activities safely and without interference. Beach is committed to *Fair Ocean Access* by minimising impacts from its offshore activities to commercial fishers.

Beach's *Fair Ocean Access Procedure* sets out commitments by Beach to genuine consultation with fishers to understand and minimise safety, environmental and economic impacts.

Where impacts cannot be minimised by Beach, and a fisher has acted to avoid risks and impacts to a Beach project, Beach's *Fair Ocean Access Procedure* includes a simple and fair process for a fisher to claim compensation for an economic loss, and a rapid approval and payment process.

Safety

Safety is Beach's first priority and operating safely will sometimes require restricted access for relatively small offshore areas over short periods. Beach will consult with fishers to seek to minimise potential disturbance to areas that are regular fishing grounds and where the fisher has no alternative fishing options.

Environmental Protection

Beach's projects are subject to stringent assessment and mitigation of potential environmental impacts. Beach must prepare Environment Plans for its offshore projects. These identify all environmental and socio-economic impacts and set out mitigation measures to reduce impacts, so they are "as low as reasonably practicable" and acceptable by regulators. Mitigation measures may include compensation where impacts on the commercial fishing industry cannot be minimised and where these impacts cause an economic loss.

Assessment of impacts includes identifying State and Commonwealth commercial fisheries that are actively fished in Beach's project areas and any biological or economic impacts to those fisheries. Consultation with commercial fishers is an important part of Beach's environmental assessment process.

Genuine consultation

Beach will consult with openness, transparency and mutual respect with fishers who may be directly impacted by Beach's projects. Beach will use its best endeavours to consult with all potentially impacted fishers during preparation of its Environment Plan for a project, and before projects commence.

Respecting the representative role of fishing associations, Beach will seek engagement with potentially impacted fishers via the relevant association. Beach will also engage directly with a fisher if they are not a member of an association, or where they request direct engagement with Beach.

Where a fishing association or fisher believes they will be impacted by a Beach project, Beach will share its fishing impact assessments, validate that with fishers, and discuss their specific circumstances with the objective of minimising potential impacts.

If project avoidance and impact minimisation is not possible, Beach will provide a copy of its full *Fair Ocean Access Procedure* and discuss mitigation options set out in the procedure, as appropriate to the individual fisher or association.

Released on16.2.2024 - Revision 1 – Submission to NOPSEMA
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Economic loss

Beach is committed to the principle that a fisher should not suffer an economic loss as a direct result of a Beach project. Losses may occur for different reasons such as:

- reduced catch from fishing in a new area in order to avoid a Beach project
- reduced catch due to impacts to a fishery from the project activities
- steaming costs to avoid a Beach project area
- costs to repair or replace fishing gear.

Acting in good faith

Beach is committed to a fair, simple and transparent process for a fisher to claim compensation, where the fisher has consulted with Beach in good faith before a project, and provided the fisher has:

- acted to avoid risks and impacts to a Beach project
- acted to mitigate any economic losses to their business that may arise from avoiding risks and impacts to a Beach project
- evidence of fishing in the Beach project area during the same time of year as the project timing, for at least three years within the last five years, unless there are genuine fishery or fishing practice reasons for lesser periods
- historical and current catch and effort evidence and the ability to demonstrate an economic loss, as set out in Beach's *Fair Ocean Access Procedure*.

Making a claim

The *Fair Ocean Access Procedure* sets out a simple claim form and describes the evidence required for a claim, such as historical catch and effort records, current catch and effort records, and fish prices.

Claims must be made within 60 days of completion of a Beach project unless there is evidence that the project has caused an impact to the fishery which has impacted future catch and caused an economic loss.

The *Fair Ocean Access Procedure* sets out timeframes for the rapid assessment and payment of successful claims and for ensuring the fisher is kept informed.

Beach will nominate a single point of contact at Beach for a fisher to liaise with.

Claims and evidence will be managed in accordance with Beach's Privacy Policy which can be found on Beach's website.

If a claim is not approved, Beach will provide written reasons for the decision.

Resolving disagreements

Where a fisher and Beach cannot agree on a fisher's claim, the *Fair Ocean Access Procedure* includes steps for appointing an independent expert to resolve the matter. Beach will pay the reasonable costs of the independent expert, as set out in the *Fair Ocean Access Procedure*.

We welcome your questions and feedback

P: 1800 959 562
E: community@beachenergy.com.au

beachenergy.com.au

beach

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Appendix E EPBC Act Protected Matters Search Reports

E. 1. Operational Area

Australian Government

Department of Climate Change, Energy, the Environment and Water

EPBC Act Protected Matters Report

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

Report created: 27-Nov-2023

- Summary
- Details
  - Matters of NES
  - Other Matters Protected by the EPBC Act
  - Extra Information
- Caveat
- Acknowledgements

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	38
Listed Migratory Species:	39

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	60
Whales and Other Cetaceans:	27
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	2
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	26
Key Ecological Features (Marine):	1
Biologically Important Areas:	18
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

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

Feature Name
Commonwealth Marine Areas (EPBC Act)

Commonwealth Marine Areas (EPBC Act)

Listed Threatened Species [Resource Information]

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

Scientific Name	Threatened Category	Presence Text
BIRD		
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche bulleri		
Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei		
Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri		
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta		
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma		
Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
FISH		
Hoplostethus atlanticus		
Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat may occur within area
Seriolella brama Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area
Thunnus maccoyii Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area
MAMMAL		
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
REPTILE		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area
SHARK		

Scientific Name	Threatened Category	Presence Text
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Centrophorus uyato Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area
Galeorhinus galeus School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea Sooty Shearwater [82651]		Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Migratory Marine Species		
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Eubalaena australis as Balaena glacialis australis		
Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Isurus oxyrinchus		
Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area
Lagenorhynchus obscurus		
Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lamna nasus		
Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae		
Humpback Whale [38]		Species or species habitat likely to occur within area
Orcinus orca		
Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus		
Sperm Whale [59]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris canutus		
Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Pterodroma mollis		
Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Stercorarius antarcticus as Catharacta skua		
Brown Skua [85039]		Species or species habitat may occur within area
Sterna striata		
White-fronted Tern [799]		Migration route may occur within area
Thalassarche bulleri		
Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei as Thalassarche sp. nov.		
Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri		
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta		
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma		
Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Fish		
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Stigmatopora nigra		
Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Stipecampus cristatus		
Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area
Urocampus carinirostris		
Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer		
Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi		
Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus		
Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammal		
Arctocephalus forsteri		
Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Arctocephalus pusillus		
Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat may occur within area
Reptile		
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area

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

Current Scientific Name	Status	Type of Presence
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area

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

Australian Marine Parks	[Resource Information]
Park Name	Zone & IUCN Categories
Zeehan	Multiple Use Zone (IUCN VI)
Zeehan	Special Purpose Zone (IUCN VI)

Extra Information

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed
Controlled action			
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval
Otway Development	2002/621	Controlled Action	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed
Not controlled action			
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
Not controlled action (particular manner)			
2D Marine Seismic Survey	2005/2295	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey	2003/1214	Not Controlled Action (Particular Manner)	Post-Approval
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval
Geographe-A gas exploration well	2000/82	Not Controlled Action (Particular Manner)	Post-Approval
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		(Particular Manner)	
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval
Southern Margins T/35P and T/36P 3D Seismic Surveys	2007/3817	Not Controlled Action (Particular Manner)	Post-Approval
Strike Oil NL Seismic Surveys	2000/107	Not Controlled Action (Particular Manner)	Post-Approval
Surface Geochemical Exploration Program, TAS	2010/5780	Not Controlled Action (Particular Manner)	Post-Approval
Thylacine-A Exploration Well	2000/81	Not Controlled Action (Particular Manner)	Post-Approval
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed

Key Ecological Features

[Resource Information]

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

Name	Region
West Tasmania Canyons	South-east

Biologically Important Areas

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

Scientific Name	Behaviour	Presence
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur
Whales		
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Known Foraging Area	Known to occur

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

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

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EPBC Act Protected Matters Report

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

Report created: 27-Nov-2023

- Summary
- Details
  - Matters of NES
  - Other Matters Protected by the EPBC Act
  - Extra Information
- Caveat
- Acknowledgements

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	38
Listed Migratory Species:	39

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	60
Whales and Other Cetaceans:	27
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	2
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	26
Key Ecological Features (Marine):	1
Biologically Important Areas:	18
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

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

Feature Name
Commonwealth Marine Areas (EPBC Act)

Commonwealth Marine Areas (EPBC Act)

Listed Threatened Species [Resource Information]

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

Scientific Name	Threatened Category	Presence Text
BIRD		
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche bulleri		
Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei		
Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri		
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta		
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma		
Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
FISH		
Hoplostethus atlanticus		
Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat may occur within area
Seriolella brama Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area
Thunnus maccoyii Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area
MAMMAL		
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
REPTILE		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area
SHARK		

Scientific Name	Threatened Category	Presence Text
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Centrophorus uyato Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area
Galeorhinus galeus School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea Sooty Shearwater [82651]		Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Migratory Marine Species		
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Eubalaena australis as Balaena glacialis australis		
Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Isurus oxyrinchus		
Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area
Lagenorhynchus obscurus		
Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lamna nasus		
Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae		
Humpback Whale [38]		Species or species habitat likely to occur within area
Orcinus orca		
Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus		
Sperm Whale [59]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris canutus		
Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Pterodroma mollis		
Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Stercorarius antarcticus as Catharacta skua		
Brown Skua [85039]		Species or species habitat may occur within area
Sterna striata		
White-fronted Tern [799]		Migration route may occur within area
Thalassarche bulleri		
Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei as Thalassarche sp. nov.		
Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri		
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta		
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma		
Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Fish		
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Stigmatopora nigra		
Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Stipecampus cristatus		
Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area
Urocampus carinirostris		
Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer		
Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi		
Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus		
Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammal		
Arctocephalus forsteri		
Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Arctocephalus pusillus		
Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat may occur within area
Reptile		
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area

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

Current Scientific Name	Status	Type of Presence
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area

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

Australian Marine Parks	[Resource Information]
Park Name	Zone & IUCN Categories
Zeehan	Multiple Use Zone (IUCN VI)
Zeehan	Special Purpose Zone (IUCN VI)

Extra Information

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed
Controlled action			
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval
Otway Development	2002/621	Controlled Action	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed
Not controlled action			
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
Not controlled action (particular manner)			
2D Marine Seismic Survey	2005/2295	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey	2003/1214	Not Controlled Action (Particular Manner)	Post-Approval
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval
Geographe-A gas exploration well	2000/82	Not Controlled Action (Particular Manner)	Post-Approval
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		(Particular Manner)	
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval
Southern Margins T/35P and T/36P 3D Seismic Surveys	2007/3817	Not Controlled Action (Particular Manner)	Post-Approval
Strike Oil NL Seismic Surveys	2000/107	Not Controlled Action (Particular Manner)	Post-Approval
Surface Geochemical Exploration Program, TAS	2010/5780	Not Controlled Action (Particular Manner)	Post-Approval
Thylacine-A Exploration Well	2000/81	Not Controlled Action (Particular Manner)	Post-Approval
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed

Key Ecological Features

[Resource Information]

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

Name	Region
West Tasmania Canyons	South-east

Biologically Important Areas

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

Scientific Name	Behaviour	Presence
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur
Whales		
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Known Foraging Area	Known to occur

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

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

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E.2 Planning Area

Australian Government

Department of Climate Change, Energy, the Environment and Water

EPBC Act Protected Matters Report

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

Report created: 24-Oct-2023

- Summary
- Details
  - Matters of NES
  - Other Matters Protected by the EPBC Act
  - Extra Information
- Caveat
- Acknowledgements

Summary

Matters of National Environment Significance

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

World Heritage Properties:	1
National Heritage Places:	2
Wetlands of International Importance (Ramsar	3
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	3
Listed Threatened Ecological Communities:	14
Listed Threatened Species:	161
Listed Migratory Species:	83

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	16
Commonwealth Heritage Places:	7
Listed Marine Species:	130
Whales and Other Cetaceans:	33
Critical Habitats:	1
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	9
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	192
Regional Forest Agreements:	5
Nationally Important Wetlands:	16
EPBC Act Referrals:	137
Key Ecological Features (Marine):	4
Biologically Important Areas:	57
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

World Heritage Properties [Resource Information]

Name	State	Legal Status
Tasmanian Wilderness	TAS	Declared property

National Heritage Places [Resource Information]

Name	State	Legal Status
Indigenous		
Western Tasmania Aboriginal Cultural Landscape	TAS	Listed place
Natural		
Tasmanian Wilderness	TAS	Listed place

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity
Corner inlet	Within 10km of Ramsar site
Lavinia	Within Ramsar site
Little waterhouse lake	Within 10km of Ramsar site

Commonwealth Marine Area [Resource Information]

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

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

Listed Threatened Ecological Communities [Resource Information]

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

Community Name	Threatened Category	Presence Text
Alpine Sphagnum Bogs and Associated Fens	Endangered	Community likely to occur within area

Community Name	Threatened Category	Presence Text
Araluen Scarp Grassy Forest	Endangered	Community may occur within area
Brogo Vine Forest of the South East Corner Bioregion	Endangered	Community likely to occur within area
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Community may occur within area
Giant Kelp Marine Forests of South East Australia	Endangered	Community may occur within area
Illawarra and south coast lowland forest and woodland ecological community	Critically Endangered	Community likely to occur within area
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically Endangered	Community likely to occur within area
Lowland Grassy Woodland in the South East Corner Bioregion	Critically Endangered	Community likely to occur within area
Lowland Native Grasslands of Tasmania	Critically Endangered	Community likely to occur within area
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Critically Endangered	Community likely to occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area
Tasmanian Forests and Woodlands dominated by black gum or Brookers gum (Eucalyptus ovata / E. brookeriana)	Critically Endangered	Community likely to occur within area
Tasmanian white gum (Eucalyptus viminalis) wet forest	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

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

Scientific Name	Threatened Category	Presence Text
null		
Mordacia praecox Non-parasitic Lamprey, Precocious Lamprey [81530]	Endangered	Species or species habitat likely to occur within area
BIRD		

Scientific Name	Threatened Category	Presence Text
Acanthiza pusilla magnirostris King Island Brown Thornbill, Brown Thornbill (King Island) [91709]	Endangered	Species or species habitat known to occur within area
Acanthornis magna greeniana King Island Scrubtit, Scrubtit (King Island) [82329]	Critically Endangered	Species or species habitat known to occur within area
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat may occur within area
Aquila audax fleayi Tasmanian Wedge-tailed Eagle, Wedge-tailed Eagle (Tasmanian) [64435]	Endangered	Breeding likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat known to occur within area
Ceyx azureus diemenensis Tasmanian Azure Kingfisher [25977]	Endangered	Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat known to occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Breeding known to occur within area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat may occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Breeding known to occur within area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Pardalotus quadragintus Forty-spotted Pardalote [418]	Endangered	Species or species habitat known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Platycercus caledonicus brownii Green Rosella (King Island) [67041]	Vulnerable	Species or species habitat known to occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Breeding known to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Breeding known to occur within area
Pterodroma neglecta neglecta Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Pycnoptilus floccosus Pilotbird [525]	Vulnerable	Species or species habitat known to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area
Strepera fuliginosa colei Black Currawong (King Island) [67113]	Vulnerable	Breeding likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Breeding known to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thinornis cucullatus cucullatus		
Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area
Tyto novaehollandiae castanops (Tasmanian population)		
Masked Owl (Tasmanian) [67051]	Vulnerable	Breeding known to occur within area
CRUSTACEAN		
Astacopsis gouldi		
Giant Freshwater Crayfish, Tasmanian Giant Freshwater Lobster [64415]	Vulnerable	Species or species habitat known to occur within area
Engaeus granulatus		
Central North Burrowing Crayfish [78959]	Endangered	Species or species habitat may occur within area
Engaeus martigener		
Furneaux Burrowing Crayfish [67220]	Endangered	Species or species habitat known to occur within area
Engaeus yabbimunna		
Burnie Burrowing Crayfish [66781]	Vulnerable	Species or species habitat may occur within area
FISH		
Brachiopsilus ziebelli		
Ziebell's Handfish, Waterfall Bay Handfish [83757]	Vulnerable	Species or species habitat likely to occur within area
Epinephelus daemelii		
Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
Galaxiella pusilla		
Eastern Dwarf Galaxias, Dwarf Galaxias [56790]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Hoplostethus atlanticus		
Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area
Prototroctes maraena		
Australian Grayling [26179]	Vulnerable	Species or species habitat known to occur within area
Rexea solandri (eastern Australian population)		
Eastern Gemfish [76339]	Conservation Dependent	Species or species habitat likely to occur within area
Seriolella brama		
Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area
Thunnus maccoyii		
Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area
Thymichthys politus		
Red Handfish [83756]	Critically Endangered	Species or species habitat may occur within area
FROG		
Heleioporus australiacus		
Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat known to occur within area
Litoria aurea		
Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area
Litoria raniformis		
Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area
Litoria watsoni		
Watson's Tree Frog [91509]	Endangered	Species or species habitat known to occur within area
Mixophyes balbus		
Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat may occur within area
INSECT		

Scientific Name	Threatened Category	Presence Text
Oreisplanus munionga larana		
Marrawah Skipper, Alpine Sedge Skipper, Alpine Skipper [77747]	Vulnerable	Species or species habitat known to occur within area
MAMMAL		
Antechinus minimus maritimus		
Swamp Antechinus (mainland) [83086]	Vulnerable	Species or species habitat likely to occur within area
Balaenoptera borealis		
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera musculus		
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus		
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Dasyurus maculatus maculatus (Tasmanian population)		
Spotted-tail Quoll, Spot-tailed Quoll, Tiger Quoll (Tasmanian population) [75183]	Vulnerable	Species or species habitat known to occur within area
Dasyurus viverrinus		
Eastern Quoll, Luaner [333]	Endangered	Species or species habitat may occur within area
Eubalaena australis		
Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Isoodon obesulus obesulus		
Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat known to occur within area
Mastacomys fuscus mordicus		
Broad-toothed Rat (mainland), Tooarrana [87617]	Vulnerable	Species or species habitat may occur within area
Mirounga leonina		
Southern Elephant Seal [26]	Vulnerable	Breeding may occur within area
Perameles gunnii gunnii		
Eastern Barred Bandicoot (Tasmania) [66651]	Vulnerable	Species or species habitat known to occur within area
Petauroides volans		
Greater Glider (southern and central) [254]	Endangered	Species or species habitat known to occur within area
Petaurus australis australis		
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat known to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area
Potorous longipes		
Long-footed Potoroo [217]	Endangered	Species or species habitat may occur within area
Potorous tridactylus trisulcatus		
Long-nosed Potoroo (southern mainland) [86367]	Vulnerable	Species or species habitat known to occur within area
Pseudomys fumeus		
Smoky Mouse, Konoom [88]	Endangered	Species or species habitat may occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Sarcophilus harrisii Tasmanian Devil [299]	Endangered	Species or species habitat likely to occur within area
PLANT		
Acacia constablei Narrabarba Wattle [10798]	Critically Endangered	Species or species habitat known to occur within area
Acacia lanigera var. gracilipes [31652]	Endangered	Species or species habitat may occur within area
Amphibromus fluitans River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat likely to occur within area
Astrotricha crassifolia Thick-leaf Star-hair [10352]	Vulnerable	Species or species habitat may occur within area
Astrotricha sp. Wingan Inlet (J.A.Jeanes 2268) Wingan Star-hair [85675]	Endangered	Species or species habitat known to occur within area
Caladenia caudata Tailed Spider-orchid [17067]	Vulnerable	Species or species habitat known to occur within area
Caladenia dienema Windswept Spider-orchid [64858]	Endangered	Species or species habitat known to occur within area
Caladenia orientalis Eastern Spider Orchid [83410]	Endangered	Species or species habitat likely to occur within area
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Calochilus pulchellus Pretty Beard Orchid, Pretty Beard-orchid [84677]	Endangered	Species or species habitat may occur within area
Centrolepis pedderensis Pedder Centrolepis, Pedder Bristlewort [12647]	Endangered	Species or species habitat likely to occur within area
Correa baeuerlenii Chef's Cap [17007]	Vulnerable	Species or species habitat known to occur within area
Correa lawrenceana var. genoensis Genoa River Correa [66626]	Endangered	Species or species habitat may occur within area
Corunastylis brachystachya Short-spiked Midge-orchid, Rocky Cape Midge Orchid [76410]	Endangered	Species or species habitat known to occur within area
Corunastylis vernalis listed as Genoplesium vernale East Lynne Midge-orchid [78699]	Vulnerable	Species or species habitat likely to occur within area
Craspedia preminghana Preminghana Billybutton [77046]	Endangered	Species or species habitat likely to occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat likely to occur within area
Diuris lanceolata Snake Orchid [10231]	Endangered	Species or species habitat known to occur within area
Eucalyptus stenostoma Jillaga Ash [3976]	Endangered	Species or species habitat may occur within area
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Haloragis exalata subsp. exalata Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat known to occur within area
Hiya distans listed as Hypolepis distans Scrambling Ground-fern [92548]	Endangered	Species or species habitat known to occur within area
Leucochrysum albicans subsp. tricolor Hoary Sunray, Grassland Paper-daisy [89104]	Endangered	Species or species habitat known to occur within area
Lomatia tasmanica King's Lomatia [3745]	Critically Endangered	Species or species habitat known to occur within area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat known to occur within area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat may occur within area
Pomaderris parrisiae Parris' Pomaderris [22119]	Vulnerable	Species or species habitat known to occur within area
Prasophyllum apoxychilum Tapered Leek-orchid [64947]	Endangered	Species or species habitat may occur within area
Prasophyllum atratum Three Hummock Leek-orchid [82677]	Critically Endangered	Species or species habitat known to occur within area
Prasophyllum favonium Western Leek-orchid [64949]	Critically Endangered	Species or species habitat known to occur within area
Prasophyllum pulchellum Pretty Leek-orchid [64953]	Critically Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Prasophyllum secutum Northern Leek-orchid [64954]	Endangered	Species or species habitat likely to occur within area
Prasophyllum spicatum Dense Leek-orchid [55146]	Vulnerable	Species or species habitat known to occur within area
Pseudocephalozia paludicola Alpine Leafy Liverwort [66441]	Vulnerable	Species or species habitat likely to occur within area
Pterostylis chlorogramma Green-striped Greenhood [56510]	Vulnerable	Species or species habitat likely to occur within area
Pterostylis cucullata Leafy Greenhood [15459]	Vulnerable	Species or species habitat known to occur within area
Pterostylis rubenachii Arthur River Greenhood [64536]	Endangered	Species or species habitat known to occur within area
Pterostylis ziegeleri Grassland Greenhood, Cape Portland Greenhood [64971]	Vulnerable	Species or species habitat likely to occur within area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat likely to occur within area
Senecio psilocarpus Swamp Fireweed, Smooth-fruited Groundsel [64976]	Vulnerable	Species or species habitat known to occur within area
Thelymitra jonesii Sky-blue Sun-orchid [76352]	Endangered	Species or species habitat likely to occur within area
Thelymitra matthewsii Spiral Sun-orchid [4168]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat known to occur within area
Westringia davidii [19079]	Vulnerable	Species or species habitat may occur within area
Xanthorrhoea arenaria Sand Grasstree [21603]	Vulnerable	Species or species habitat may occur within area
Xanthorrhoea bracteata Shiny Grasstree [7950]	Endangered	Species or species habitat may occur within area
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat likely to occur within area
Zieria tuberculata Warty Zieria [56736]	Vulnerable	Species or species habitat known to occur within area
REPTILE		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Scientific Name	Threatened Category	Presence Text
Lissolepis coventryi		
Swamp Skink, Eastern Mourning Skink [84053]	Endangered	Species or species habitat likely to occur within area
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
SHARK		
Carcharias taurus (east coast population)		
Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Congregation or aggregation known to occur within area
Carcharodon carcharias		
White Shark, Great White Shark [64470]	Vulnerable	Breeding known to occur within area
Centrophorus harrissoni		
Harrisson's Dogfish, Endeavour Dogfish, Dumb Gulper Shark, Harrison's Deepsea Dogfish [68444]	Conservation Dependent	Species or species habitat likely to occur within area
Centrophorus uyato		
Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area
Galeorhinus galeus		
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat likely to occur within area
Rhincodon typus		
Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Zearaja maugeana		
Maugean Skate, Port Davey Skate [83504]	Endangered	Species or species habitat known to occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea Sooty Shearwater [82651]		Breeding known to occur within area
Ardenna pacifica Wedge-tailed Shearwater [84292]		Breeding known to occur within area
Ardenna tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Hydroprogne caspia Caspian Tern [808]		Breeding known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Sternula albifrons Little Tern [82849]		Breeding known to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Breeding known to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Migratory Marine Species		
Balaenoptera bonaerensis		
Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis		
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera edeni		
Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus		
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus		
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Caperea marginata		
Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area
Carcharhinus longimanus		
Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area
Carcharodon carcharias		
White Shark, Great White Shark [64470]	Vulnerable	Breeding known to occur within area
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]		Foraging, feeding or related behaviour known to occur within area
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Breeding known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat likely to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area

Scientific Name	Threatened Category	Presence Text
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Roosting known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area
Thalasseus bergii Greater Crested Tern [83000]		Breeding known to occur within area
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area
Tringa glareola Wood Sandpiper [829]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Roosting known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

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

Commonwealth Land Name	State
Communications, Information Technology and the Arts - Australian Postal Corporation	
Commonwealth Land - Australian Postal Commission [12052]	NSW
Communications, Information Technology and the Arts - Telstra Corporation Limited	
Commonwealth Land - Australian Telecommunications Commission [12053]	NSW
Commonwealth Land - Australian Telecommunications Commission [12050]	NSW
Commonwealth Land - Telstra Corporation Limited [12051]	NSW
Commonwealth Land - Telstra Corporation Limited [15888]	NSW
Unknown	
Commonwealth Land - [60346]	TAS
Commonwealth Land - [21497]	VIC
Commonwealth Land - [60115]	TAS
Commonwealth Land - [60066]	TAS
Commonwealth Land - [60113]	TAS
Commonwealth Land - [60135]	TAS
Commonwealth Land - [21488]	VIC
Commonwealth Land - [21498]	VIC

Commonwealth Land Name	State
Commonwealth Land - [21496]	VIC
Commonwealth Land - [60116]	TAS
Commonwealth Land - [60114]	TAS

Commonwealth Heritage Places

[Resource Information]

Name	State	Status
Historic		
Cape Sorell Lighthouse	TAS	Listed place
Cape Wickham Lighthouse	TAS	Listed place
Gabo Island Lighthouse	VIC	Listed place
Goose Island Lighthouse	TAS	Listed place
Montague Island Lighthouse	NSW	Listed place
Table Cape Lighthouse	TAS	Listed place
Wilsons Promontory Lighthouse	VIC	Listed place

Listed Marine Species

[Resource Information]

Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]		Breeding known to occur within area
Ardenna pacifica as Puffinus pacificus Wedge-tailed Shearwater [84292]		Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
Ardenna tenuirostris as Puffinus tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat likely to occur within area overfly marine area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area overfly marine area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area
Chroicocephalus novaehollandiae as Larus novaehollandiae Silver Gull [82326]		Breeding known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni as Diomedea gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Eudyptula minor Little Penguin [1085]		Breeding known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Breeding known to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Hydroprogne caspia as Sterna caspia Caspian Tern [808]		Breeding known to occur within area
Larus dominicanus Kelp Gull [809]		Breeding known to occur within area
Larus pacificus Pacific Gull [811]		Breeding known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Breeding known to occur within area overfly marine area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area overfly marine area
Myiagra cyanoleuca Satin Flycatcher [612]		Breeding known to occur within area overfly marine area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Breeding known to occur within area overfly marine area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Onychoprion fuscatus as Sterna fuscata Sooty Tern [90682]		Breeding known to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Pelagodroma marina White-faced Storm-Petrel [1016]		Breeding known to occur within area
Pelecanoides urinatrix Common Diving-Petrel [1018]		Breeding known to occur within area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area
Phalacrocorax fuscescens Black-faced Cormorant [59660]		Breeding known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Roosting known to occur within area overfly marine area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Pterodroma cervicalis White-necked Petrel [59642]		Species or species habitat may occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Breeding known to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Species or species habitat known to occur within area overfly marine area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area
Sterna striata White-fronted Tern [799]		Breeding known to occur within area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Breeding known to occur within area
Sternula nereis as Sterna nereis Fairy Tern [82949]		Breeding known to occur within area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat known to occur within area overfly marine area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche bulleri platei as Thalassarche sp. nov.		
Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri		
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta		
Shy Albatross [89224]	Endangered	Breeding known to occur within area
Thalassarche chrysostoma		
Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche eremita		
Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thalasseus bergii as Sterna bergii		
Greater Crested Tern [83000]		Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
Thinornis cucullatus as Thinornis rubricollis		
Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area
Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis		
Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Tringa brevipes as Heteroscelus brevipes		
Grey-tailed Tattler [851]		Roosting known to occur within area
Tringa glareola		
Wood Sandpiper [829]		Species or species habitat known to occur within area overfly marine area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area overfly marine area
Tringa stagnatilis		
Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area overfly marine area
Xenus cinereus		
Terek Sandpiper [59300]		Roosting known to occur within area overfly marine area
Fish		
Acentronura tentaculata		
Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area
Cosmocampus howensis		
Lord Howe Pipefish [66208]		Species or species habitat may occur within area
Heraldia nocturna		
Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Hippocampus minotaur Bullneck Seahorse [66705]		Species or species habitat may occur within area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area
Kimblaeus bassensis Trawl Pipefish, Bass Strait Pipefish [66247]		Species or species habitat may occur within area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Mitotichthys mollisoni Mollison's Pipefish [66260]		Species or species habitat may occur within area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammal		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Breeding known to occur within area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Breeding known to occur within area
Mirounga leonina Southern Elephant Seal [26]	Vulnerable	Breeding may occur within area
Reptile		

Scientific Name	Threatened Category	Presence Text
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area

Whales and Other Cetaceans		[Resource Information]
Current Scientific Name	Status	Type of Presence
Mammal		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Berardius arnuxii Arnoux's Beaked Whale [70]		Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Hyperoodon planifrons Southern Bottlenose Whale [71]		Species or species habitat may occur within area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Foraging, feeding or related behaviour known to occur within area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area
Mesoplodon ginkgodens Gingko-toothed Beaked Whale, Gingko-toothed Whale, Gingko Beaked Whale [59564]		Species or species habitat may occur within area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area
Tasmacetus shepherdi Shepherd's Beaked Whale, Tasman Beaked Whale [55]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area

Critical Habitats [Resource Information]

Name	Type of Presence
Thalassarche cauta (Shy Albatross) - Albatross Island, The Mewstone, Pedra Branca	Listed Critical Habitat

Australian Marine Parks [Resource Information]

Park Name	Zone & IUCN Categories
Flinders	Marine National Park Zone (IUCN II)
Tasman Fracture	Marine National Park Zone (IUCN II)
Apollo	Multiple Use Zone (IUCN VI)
Beagle	Multiple Use Zone (IUCN VI)
Boags	Multiple Use Zone (IUCN VI)

Park Name	Zone & IUCN Categories
East Gippsland	Multiple Use Zone (IUCN VI)
Franklin	Multiple Use Zone (IUCN VI)
Tasman Fracture	Multiple Use Zone (IUCN VI)
Zeehan	Special Purpose Zone (IUCN VI)

Extra Information

State and Territory Reserves

[Resource Information]

Protected Area Name	Reserve Type	State
Albatross Island	Nature Reserve	TAS
Anderson Islands	Conservation Area	TAS
Arthur Bay	Conservation Area	TAS
Arthur-Pieman	Conservation Area	TAS
Arthur River Rd Marrawah	Conservation Covenant	TAS
Baawang	Reference Area	VIC
Badger Island	Indigenous Protected Area	TAS
Badger River	Regional Reserve	TAS
Bass Pyramid	Nature Reserve	TAS
Batemans	Marine Park	NSW
Ben Boyd	National Park	NSW
Bermaguee	Nature Reserve	NSW
Bermagui	Flora Reserve	NSW
Biamanga	National Park	NSW
Big Green Island	Nature Reserve	TAS
Bird Island	Game Reserve	TAS
Black Pyramid Rock	Nature Reserve	TAS
Blyth Point	Conservation Area	TAS
Boat Harbour Road Killiecrankie	Conservation Covenant	TAS

Protected Area Name	Reserve Type	State
Boxen Island	Conservation Area	TAS
Brick Islands	Conservation Area	TAS
Brougham Sugarloaf	Conservation Area	TAS
Bull Rock	Conservation Area	TAS
Bun Beetons Point	Conservation Area	TAS
Calm Bay	State Reserve	TAS
Cape Howe	Wilderness Zone	VIC
Cape Howe	Marine National Park	VIC
Cape Sorell	Historic Site	TAS
Cape Wickham	Conservation Area	TAS
Cape Wickham	State Reserve	TAS
Cataraqui Point	Conservation Area	TAS
Chalky Island	Conservation Area	TAS
Chappell Islands	Nature Reserve	TAS
City of Melbourne Bay	Conservation Area	TAS
Colliers Forest Reserve	Conservation Covenant	TAS
Colliers Swamp	Conservation Area	TAS
Cone Islet	Conservation Area	TAS
Councillor Island	Nature Reserve	TAS
Counsel Hill	Conservation Area	TAS
Craggy Island	Conservation Area	TAS
Crayfish Creek	Regional Reserve	TAS
Croajingolong	National Park	VIC
Curtis Island	Nature Reserve	TAS
Darling Range	Conservation Area	TAS
Devils Tower	Nature Reserve	TAS
Disappointment Bay	State Reserve	TAS

Protected Area Name	Reserve Type	State
Doughboy Island	Conservation Area	TAS
East Gippsland Coastal streams	Natural Catchment Area	VIC
East Kangaroo Island	Nature Reserve	TAS
East Moncoeur Island	Conservation Area	TAS
Edgcumbe Beach	Conservation Area	TAS
Egg Beach	Conservation Area	TAS
Eldorado	Conservation Area	TAS
Emita	Nature Recreation Area	TAS
Eurobodalla	National Park	NSW
Foochow	Conservation Area	TAS
Forwards Beach	Conservation Area	TAS
Fotheringate Bay	Conservation Area	TAS
Four Mile Beach	Regional Reserve	TAS
Gentle Annie	Conservation Area	TAS
Goose Island	Conservation Area	TAS
Gulaga	National Park	NSW
Harbour Islets	Conservation Area	TAS
Harcus Island	Conservation Area	TAS
Harcus River Rd West Montagu	Conservation Covenant	TAS
Harcus River Road #4	Conservation Covenant	TAS
Harcus River Road Marrawah	Conservation Covenant	TAS
Henderson Islets	Conservation Area	TAS
Highfield	Historic Site	TAS
Hogan Group	Conservation Area	TAS
Holts Point	Conservation Area	TAS
Hunter Island	Conservation Area	TAS

Protected Area Name	Reserve Type	State
Isabella Island	Nature Reserve	TAS
Jacksons Cove	Conservation Area	TAS
Kangaroo Island	Conservation Area	TAS
Kent Group	National Park	TAS
Killiecrankie	Nature Recreation Area	TAS
Kings Run	Private Nature Reserve	TAS
Kings Run #2	Conservation Covenant	TAS
Kuhns Rd Memana	Conservation Covenant	TAS
Lavinia	State Reserve	TAS
Little Chalky Island	Conservation Area	TAS
Little Island	Conservation Area	TAS
Little Peggs Beach	State Reserve	TAS
Little Trefoil	Conservation Area	TAS
Long Island	Conservation Area	TAS
Low Point	Conservation Area	TAS
lungatalanana	Indigenous Protected Area	TAS
Lyons Cottage	Historic Site	TAS
Macquarie Harbour	Historic Site	TAS
Marriott Reef	Conservation Area	TAS
Marshall Beach	Conservation Area	TAS
Mile Island	Conservation Area	TAS
Millwood Road	Conservation Covenant	TAS
Mimosa Rocks	National Park	NSW
Montague Island	Nature Reserve	NSW
Mount Chappell Island	Indigenous Protected Area	TAS
Mount Dundas	Regional Reserve	TAS

Protected Area Name	Reserve Type	State
Mount Heemskirk	Regional Reserve	TAS
Mount Tanner	Nature Recreation Area	TAS
Mulligans Hill	Conservation Covenant	TAS
Mulligans Hill	Conservation Area	TAS
Mumbulla	Flora Reserve	NSW
Murkay Islets	Conservation Area	TAS
Murrah	Flora Reserve	NSW
Nadgee	Nature Reserve	NSW
Nares Rocks	Conservation Area	TAS
Neds Reef	Conservation Area	TAS
New Year Island	Game Reserve	TAS
Night Island	Conservation Area	TAS
Ninth Island	Conservation Area	TAS
North East Islet	Nature Reserve	TAS
North East River	Game Reserve	TAS
Ocean Beach	Conservation Area	TAS
Oyster Rocks	Conservation Area	TAS
Palana Beach	Nature Recreation Area	TAS
Pardoe Northdown	Conservation Area	TAS
Pasco Group	Conservation Area	TAS
Pegarah	Private Nature Reserve	TAS
Pegarah Forest	Conservation Covenant	TAS
Pegarah Rd King Island	Conservation Covenant	TAS
Penguin Islet	Nature Reserve	TAS
Perkins Island	Conservation Area	TAS
Petrel Islands	Game Reserve	TAS
Pieman River	State Reserve	TAS

Protected Area Name	Reserve Type	State
Point Hicks	Marine National Park	VIC
Preminghana	Indigenous Protected Area	TAS
Prime Seal Island	Conservation Area	TAS
Rame Head	Remote and Natural Area - Schedule 6, National Parks Act	VIC
Red Hut Point	Conservation Area	TAS
Red Hut Road #1	Conservation Covenant	TAS
Red Hut Road #2	Conservation Covenant	TAS
Reedy Lagoon	Private Nature Reserve	TAS
Reef Island	Conservation Area	TAS
Reid Rocks	Nature Reserve	TAS
Rocky Cape	National Park	TAS
Rodondo Island	Nature Reserve	TAS
Roydon Island	Conservation Area	TAS
Sandpatch	Wilderness Zone	VIC
Seacrow Islet	Conservation Area	TAS
Sea Elephant	Conservation Area	TAS
Sea Elephant River	Conservation Covenant	TAS
Seal Creek	Reference Area	VIC
Seal Rocks	Conservation Area	TAS
Seal Rocks	State Reserve	TAS
Sentinel Island	Conservation Area	TAS
Settlement Point	Conservation Area	TAS
Shell Islets	Conservation Area	TAS
Sister Islands	Conservation Area	TAS
Slaves Bay	Conservation Area	TAS

Protected Area Name	Reserve Type	State
Southern Wilsons Promontory	Remote and Natural Area - Schedule 6, National Parks Act	VIC
South Pats River	Conservation Area	TAS
Southwest	Conservation Area	TAS
Southwest	National Park	TAS
Spike Island	Conservation Area	TAS
Stack Island	Game Reserve	TAS
Stanley	Conservation Area	TAS
Stokes Point	Conservation Area	TAS
Strahan Customs House	Historic Site	TAS
Strzelecki	National Park	TAS
Sugarloaf Rock	Conservation Area	TAS
Sundown Point	State Reserve	TAS
Sydney Cove	Historic Site	TAS
Table Cape	Conservation Area	TAS
Table Cape	State Reserve	TAS
Tatlows Beach	Conservation Area	TAS
Teepookana	Regional Reserve	TAS
Tenth Island	Nature Reserve	TAS
The Dock	Conservation Covenant	TAS
The Doughboys	Nature Reserve	TAS
The Nut	State Reserve	TAS
Three Hummock Island	State Reserve	TAS
Three Sisters-Goat Island	Nature Reserve	TAS
Tikkawoppa Plateau	Regional Reserve	TAS
Trial Harbour	State Reserve	TAS
Trousers Point Beach	Conservation Area	TAS

Protected Area Name	Reserve Type	State
Tully River	Conservation Area	TAS
Unnamed (Duck Bay)	Conservation Area	TAS
Wallaby Islands	Conservation Area	TAS
Warra Creek	Regional Reserve	TAS
Welcome River	State Reserve	TAS
West Coast Range	Regional Reserve	TAS
West Inlet	Conservation Area	TAS
West Moncoeur Island	Nature Reserve	TAS
West Point	State Reserve	TAS
Wilsons Promontory	National Park	VIC
Wilsons Promontory	Marine National Park	VIC
Wilsons Promontory Marine Reserve	National Parks Act Schedule 4 park or reserve	VIC
Wingaroo	Nature Reserve	TAS
Wright Rock	Nature Reserve	TAS
Wybalenna Island	Conservation Area	TAS
Yambacoona	Conservation Covenant	TAS

Regional Forest Agreements

[Resource Information]

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

RFA Name	State
East Gippsland RFA	Victoria
Eden RFA	New South Wales
Gippsland RFA	Victoria
Southern RFA	New South Wales
Tasmania RFA	Tasmania

Nationally Important Wetlands

[Resource Information]

Wetland Name	State

Wetland Name	State
Benedore River	VIC
Coila Creek Delta	NSW
Lake Ashwood	TAS
Lake Bantick	TAS
Lake Garcia	TAS
Lavinia Nature Reserve	TAS
Mallacoota Inlet Wetlands	VIC
Nadgee Lake and tributary wetlands	NSW
Nargal Lake	NSW
Rocky Cape Marine Area	TAS
Tamboon Inlet Wetlands	VIC
Thompsons Lagoon	TAS
Thurra River	VIC
Tuross River Estuary	NSW
Unnamed Wetland	TAS
Wallaga Lake	NSW

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Bermagui Golf Club Proposed Subdivision (Stages 3-8)	2022/09242		Post-Approval
Blue Marlin Offshore Wind Energy Project	2023/09532		Referral Decision
Eurobodalla Regional Hospital	2023/09506		Completed
Greater Gippsland Offshore Wind Project	2022/09379		Assessment
Greater Gippsland Offshore Wind Project Initial Marine Field Investigations	2022/09374		Completed
Robbins Island Renewable Energy Park, Robbins Island, Tasmania	2017/8096		Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Dairy Farm expansion on the Woolnorth property	2013/6710	Controlled Action	Completed
Develop an Offshore Tidal Energy Facility	2008/4518	Controlled Action	Completed
DPIPWE - Arthur-Pieman Conservation Area - off-road vehicle mitigation actions	2017/8038	Controlled Action	Completed
Heemskirk Windfarm Development	2002/678	Controlled Action	Completed
Robbins Island Road to Hampshire Transmission Line	2020/8656	Controlled Action	Referral Decision
Star of the South Offshore Wind Farm Project	2020/8650	Controlled Action	Guidelines Issued
Tarkine Forest Drive Road Upgrade	2011/6210	Controlled Action	Post-Approval
Tasmania Natural Gas Project - Stage 2	2001/211	Controlled Action	Post-Approval
The Tarkine Road Project	2009/5169	Controlled Action	Completed
Western Plains wind farm	2010/5712	Controlled Action	Assessment Approach
White Rock Wind Farm	2003/986	Controlled Action	Completed
Wind Farm Construction	2000/12	Controlled Action	Post-Approval
Yolla Gas Field (TRL1) Development	2001/321	Controlled Action	Post-Approval
Not controlled action			
2004/2005 drilling program for exploration and production (VIC 01-06, 09-11, 16, 18 & 19 and VIC/RL	2003/1282	Not Controlled Action	Completed
2D seismic survey, Petroleum Exploration Permit Area T/36P	2004/1787	Not Controlled Action	Completed
2D seismic Survey in VIC/P55, VIC/RL2 and VIC/P41	2004/1876	Not Controlled Action	Completed
Basker-Manta-Gummy Oil Development	2011/6052	Not Controlled Action	Completed
Basker-Manta Oil Field Development	2005/2026	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Bass Basin - Pee Jay-1 - Drilling Program	2007/3908	Not Controlled Action	Completed
Biodiversity Impacts Audit	2011/6191	Not Controlled Action	Completed
Capture of Juvenile Tasmanian Devils for Conservation Purposes	2007/3261	Not Controlled Action	Completed
Capture of Tasmanian Devils from Disease-Free Areas	2007/3883	Not Controlled Action	Completed
Caswell Street - Moruya East	2020/8781	Not Controlled Action	Completed
Construction of an ocean access boat ramp at Bastion Point	2004/1407	Not Controlled Action	Completed
Development of Kipper gas field within Vic/L3, Vic/L4 Vic/RL2	2005/2484	Not Controlled Action	Completed
Development of Turrum Oil Field and associated infrastructure	2003/1204	Not Controlled Action	Completed
Dredging of Tuross Lake channel and depositon of spoil in lake	2004/1554	Not Controlled Action	Completed
Drilling and side track completion at Baleen gas production well in Production Licence area VIC/L21	2004/1535	Not Controlled Action	Completed
Drilling of 'Culverin' oil exploration well, permit VIC/P56	2005/2279	Not Controlled Action	Completed
Drilling of Scallop-1 Exploration Well	2003/917	Not Controlled Action	Completed
Duck Irrigation System, north-west coast Tasmania	2016/7778	Not Controlled Action	Completed
East Pilchard exploration well	2001/137	Not Controlled Action	Completed
Exploration Drilling Well Trefoil-1	2003/1058	Not Controlled Action	Completed
Gippsland Basin Seismic Programme	2004/1866	Not Controlled Action	Completed
Hayes Hill Ridge Wind Farm	2007/3437	Not Controlled Action	Completed
Hemingway1/Oil Exploration	2001/177	Not Controlled Action	Completed
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
Installation of a 3.5kW Wind Turbine	2012/6604	Not Controlled Action	Completed
Installation of optic fibre cable from Inverloch, Victoria to Stanley, Tasmania	2002/906	Not Controlled Action	Completed
Longtom-3 Gas Appraisal Well, VIC/P54	2005/2494	Not Controlled Action	Completed
Longtom Gas Pipeline Development, VIC/P54	2006/3072	Not Controlled Action	Completed
Marlin-Snapper Gas Pipeline Project	2006/3197	Not Controlled Action	Completed
Melville 1 Oil Exploration Well	2001/167	Not Controlled Action	Completed
Millwood Road Gravel Quarry	2002/602	Not Controlled Action	Completed
Mixed use residential development (Camdale Development)	2006/2634	Not Controlled Action	Completed
New Water Infrastructure Upgrade, Grassy Dam, King Island	2013/6882	Not Controlled Action	Completed
Northright-1 Exploration Well	2001/209	Not Controlled Action	Completed
Offshore Petroleum Exploration	2001/289	Not Controlled Action	Completed
Offshore Seismic Survey	2001/498	Not Controlled Action	Completed
Port Latta Wind Farm, Tas	2018/8249	Not Controlled Action	Completed
Remote power generation project	2005/2287	Not Controlled Action	Completed
Saline Recharge of meromictic Lake Fidler	2004/1334	Not Controlled Action	Completed
Sole-2 appraisal gas well, VIC/RL3	2002/636	Not Controlled Action	Completed
Sole gas field development	2003/937	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Spikey Beach 1, West Triton Drilling Program, Bass Basin Permit T/38P	2007/3914	Not Controlled Action	Completed
Subdivision for Residential development	2004/1823	Not Controlled Action	Completed
Telstra optic fibre cable across Bass Strait - Sub bottom profiler Surve	2002/779	Not Controlled Action	Completed
Turrum Phase 2 Development Project	2008/4191	Not Controlled Action	Completed
West Triton Drilling Program - Gippsland Basin	2007/3915	Not Controlled Action	Completed
Not controlled action (particular manner)			
2D & 3D seismic survey T/39P	2005/2237	Not Controlled Action (Particular Manner)	Post-Approval
2D Marine Seismic Survey	2005/2295	Not Controlled Action (Particular Manner)	Post-Approval
2D Marine Seismic Survey in Permit Areas T/32P and T/33P	2002/845	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Aquisition Survey	2008/4041	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey	2003/1214	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey	2008/3962	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey	2008/4131	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey	2008/4066	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
2D seismic survey in the Sole gas field and adjacent acreage in the Gippsland Basin (VIC RL/3 & VIC/	2002/871	Not Controlled Action (Particular Manner)	Post-Approval
2D seismic survey Permit Area VIC/P49	2006/2943	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey Program in Bass Strait	2008/4040	Not Controlled Action (Particular Manner)	Post-Approval
3D Marine Seismic Survey within Torquay Sub-basin off sthn Victoria	2012/6256	Not Controlled Action (Particular Manner)	Post-Approval
3D Seismic Survey	2008/4528	Not Controlled Action (Particular Manner)	Post-Approval
Apache 3D seismic exploration survey	2006/3146	Not Controlled Action (Particular Manner)	Post-Approval
Aroo Chappell 3D seismic survey	2010/5701	Not Controlled Action (Particular Manner)	Post-Approval
Bass Basin 2D and 3D seismic surveys (T/38P & T/37P)	2007/3650	Not Controlled Action (Particular Manner)	Post-Approval
Bream 3D seismic survey	2006/2556	Not Controlled Action (Particular Manner)	Post-Approval
Collection of cast bull kelp	2002/813	Not Controlled Action (Particular Manner)	Post-Approval
Construct private dwelling	2008/4234	Not Controlled Action (Particular Manner)	Post-Approval
Dalrymple 3D Seismic Survey	2010/5680	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval
Eden Breakwater Wharf extension, NSW	2015/7582	Not Controlled Action (Particular Manner)	Post-Approval
Eden Breakwater Wharf Extension, NSW	2016/7828	Not Controlled Action (Particular Manner)	Completed
Exploration drilling of the Craigow-1 and Tolpuddle-1 wells	2010/5725	Not Controlled Action (Particular Manner)	Post-Approval
Gas Pipeline	2000/20	Not Controlled Action (Particular Manner)	Post-Approval
Gippsland 2D Marine Seismic Survey - VIC/P-63, VIC/P-64 and T/46P	2009/5241	Not Controlled Action (Particular Manner)	Post-Approval
Granville Wind Farm, TAS	2012/6585	Not Controlled Action (Particular Manner)	Post-Approval
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
Inspection of project vessels for presence of invasive marine pests in Commonwealth waters off Victo	2012/6362	Not Controlled Action (Particular Manner)	Post-Approval
Labatt 3D Seismic Survey T/47P Bass Strait	2007/3759	Not Controlled Action (Particular Manner)	Post-Approval
Longtom-5 Offshore Production Drilling (Vic/L29), VIC	2012/6498	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Longtom South -1 Exploration Drilling	2011/6217	Not Controlled Action (Particular Manner)	Post-Approval
Luxury Cruise on the Gordon River, Tasmanian Wilderness PT 2	2006/3044	Not Controlled Action (Particular Manner)	Post-Approval
Luxury Cruise on the Gordon River, Tasmanian Wilderness WHA	2004/1846	Not Controlled Action (Particular Manner)	Post-Approval
Maintenance dredging of 150,000 cubic metres of sediment in Burnie Port and du	2004/1569	Not Controlled Action (Particular Manner)	Post-Approval
Marine Farming Expansion, Macquarie Harbour, TAS	2012/6406	Not Controlled Action (Particular Manner)	Post-Approval
Non-exclusive 3-D Marine Seismic Survey, Bass Strait	2002/775	Not Controlled Action (Particular Manner)	Post-Approval
Northern Fields 3D Seismic Survey	2001/140	Not Controlled Action (Particular Manner)	Post-Approval
Origin Energy Silvereye-1 Exploration Drilling Programme	2010/5702	Not Controlled Action (Particular Manner)	Post-Approval
OTE10 2D Marine Seismic Survey	2009/5223	Not Controlled Action (Particular Manner)	Post-Approval
Removal of Tasmanian blue gums	2004/1356	Not Controlled Action (Particular Manner)	Post-Approval
Remove silt build up on existing swales around the perimeter of the Three Hummo	2010/5676	Not Controlled Action (Particular Manner)	Post-Approval
Rockhopper-1 and Trefoil-2 Exploration Drilling in Permit Area T/18P	2009/4776	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Seismic Exploration in Permit VIC/P41	2001/267	Not Controlled Action (Particular Manner)	Post-Approval
Seismic Survey	2001/206	Not Controlled Action (Particular Manner)	Post-Approval
Seismic survey, Gippsland Basin	2001/525	Not Controlled Action (Particular Manner)	Post-Approval
Shearwater 2D and 3D marine seismic survey	2005/2180	Not Controlled Action (Particular Manner)	Post-Approval
Silvereye 3D Seismic Survey	2007/3551	Not Controlled Action (Particular Manner)	Post-Approval
Southern Flanks 2D Marine Seismic Survey	2010/5288	Not Controlled Action (Particular Manner)	Post-Approval
Southern Margins 3D Seismic Survey VIC/P55	2007/3780	Not Controlled Action (Particular Manner)	Post-Approval
Southern Margins T/35P and T/36P 3D Seismic Surveys	2007/3817	Not Controlled Action (Particular Manner)	Post-Approval
Surface Geochemical Exploration Program, TAS	2010/5780	Not Controlled Action (Particular Manner)	Post-Approval
Tap Oil Ltd Molson 2D Seismic Survey T47P	2008/3967	Not Controlled Action (Particular Manner)	Post-Approval
Torquay Sub-basin (VIC/P62) OTE12-3D Seismic Survey	2012/6655	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Tuskfish 3D Seismic Survey, Bass Strait	2002/864	Not Controlled Action (Particular Manner)	Post-Approval
Upgrade of Arthur River Road	2003/930	Not Controlled Action (Particular Manner)	Post-Approval
Wilson's Creek Bridge Replacement, Bass Highway	2007/3892	Not Controlled Action (Particular Manner)	Post-Approval
Wolseley 3D seismic acquisition survey	2010/5703	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
3D Marine Seismic Survey	2011/6156	Referral Decision	Completed
All actions taken in response to the current severe bushfires in Victoria.	2009/4787	Referral Decision	Completed
Breeding program for Grey Nurse Sharks	2007/3245	Referral Decision	Completed
Darymple 3D Seismic Survey, Petroleum Exploration Permit T/41P	2010/5322	Referral Decision	Completed
Holloman 2010 Vic/P60 3D Seismic Acquisition Survey Program	2009/5251	Referral Decision	Completed
Kelly Channel Discharge, Macquarie Harbour, Tasmania	2017/8057	Referral Decision	Completed
Land clearing for stock grazing	2005/2176	Referral Decision	Completed
Longtom 5 Offshore Production Drilling (VIC/L29)	2012/6404	Referral Decision	Completed
Longtom-5 Offshore Production Drilling (Vic/L29)	2012/6413	Referral Decision	Completed
Mineral Exploration Ringarooma Bay	2012/6508	Referral Decision	Completed
Shark 3D Seismic Survey	2007/3294	Referral Decision	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Referral decision			
Stanton 3D Marine Seismic Survey	2013/6764	Referral Decision	Completed
Wolseley 3D Seismic Acquisition Survey in Permit T/32P	2010/5291	Referral Decision	Completed

Key Ecological Features [Resource Information]

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

Name	Region
Big Horseshoe Canyon	South-east
Shelf rocky reefs	Temperate east
Upwelling East of Eden	South-east
West Tasmania Canyons	South-east

Biologically Important Areas

Scientific Name	Behaviour	Presence
Dolphins		
Tursiops aduncus Indo-Pacific/Spotted Bottlenose Dolphin [68418]	Breeding	Likely to occur
Seabirds		
Ardenna carneipes Flesh-footed Shearwater [82404]	Foraging	Known to occur
Ardenna grisea Sooty Shearwater [82651]	Breeding	Known to occur
Ardenna grisea Sooty Shearwater [82651]	Foraging	Likely to occur
Ardenna grisea Sooty Shearwater [82651]	Foraging	Known to occur
Ardenna pacifica Wedge-tailed Shearwater [84292]	Breeding	Known to occur
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur
Ardenna tenuirostris Short-tailed Shearwater [82652]	Breeding	Known to occur

Scientific Name	Behaviour	Presence
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Likely to occur
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Likely to occur
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur
Eudyptula minor Little Penguin [1085]	Breeding	Likely to occur
Eudyptula minor Little Penguin [1085]	Breeding	Known to occur
Eudyptula minor Little Penguin [1085]	Foraging	Known to occur
Macronectes giganteus Southern Giant Petrel [1060]	Foraging	Known to occur
Macronectes halli Northern Giant Petrel [1061]	Foraging	Known to occur
Morus serrator Australasian Gannet [1020]	Aggregation	Known to occur
Morus serrator Australasian Gannet [1020]	Foraging	Known to occur
Oceanites oceanites Wilsons Storm Petrel [1034]	Migration	Known to occur
Pelagodroma marina White-faced Storm-petrel [1016]	Breeding	Known to occur
Pelagodroma marina White-faced Storm-petrel [1016]	Foraging	Known to occur

Scientific Name	Behaviour	Presence
Pelecanoides urinatrix Common Diving-petrel [1018]	Breeding	Known to occur
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur
Phalacrocorax fuscescens Black-faced Cormorant [59660]	Breeding	Known to occur
Phalacrocorax fuscescens Black-faced Cormorant [59660]	Foraging	Likely to occur
Phalacrocorax fuscescens Black-faced Cormorant [59660]	Foraging	Known to occur
Procellaria parkinsoni Black Petrel [1048]	Foraging	Likely to occur
Pterodroma macroptera Great-winged Petrel [1035]	Foraging	Likely to occur
Pterodroma mollis Soft-plumaged Petrel [1036]	Breeding	Known to occur
Pterodroma mollis Soft-plumaged Petrel [1036]	Foraging	Known to occur
Sterna striata White-fronted Tern [799]	Breeding	Known to occur
Sterna striata White-fronted Tern [799]	Foraging	Known to occur
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur
Thalassarche cauta cauta Shy Albatross [82345]	Breeding	Known to occur
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur
Thalassarche cauta steadi White-capped Albatross [82344]	Foraging	Known to occur

Scientific Name	Behaviour	Presence
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Likely to occur
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur
Thalasseus bergii Crested Tern [83000]	Breeding	Known to occur
Thalasseus bergii Crested Tern [83000]	Foraging	Likely to occur
Sharks		
Carcharias taurus Grey Nurse Shark [64469]	Foraging	Known to occur
Carcharias taurus Grey Nurse Shark [64469]	Migration	Known to occur
Carcharodon carcharias White Shark [64470]	Breeding (nursery area)	Known to occur
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur
Whales		

Scientific Name	Behaviour	Presence
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Known Foraging Area	Known to occur
Megaptera novaeangliae Humpback Whale [38]	Foraging	Known to occur

Bioregional Assessments

SubRegion	BioRegion	Website
Gippsland	Gippsland Basin	BA website

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

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

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EPBC Act Protected Matters Report

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

Report created: 24-Oct-2023

- Summary
- Details
  - Matters of NES
  - Other Matters Protected by the EPBC Act
  - Extra Information
- Caveat
- Acknowledgements

Summary

Matters of National Environment Significance

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

World Heritage Properties:	1
National Heritage Places:	5
Wetlands of International Importance (Ramsar	7
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	3
Listed Threatened Ecological Communities:	13
Listed Threatened Species:	160
Listed Migratory Species:	81

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	58
Commonwealth Heritage Places:	8
Listed Marine Species:	131
Whales and Other Cetaceans:	32
Critical Habitats:	1
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	9
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	203
Regional Forest Agreements:	3
Nationally Important Wetlands:	25
EPBC Act Referrals:	256
Key Ecological Features (Marine):	4
Biologically Important Areas:	37
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

World Heritage Properties		[Resource Information]
Name	State	Legal Status
Tasmanian Wilderness	TAS	Declared property

National Heritage Places		[Resource Information]
Name	State	Legal Status
Historic		
Great Ocean Road and Scenic Environs	VIC	Listed place
Point Nepean Defence Sites and Quarantine Station Area	VIC	Listed place
Quarantine Station and Surrounds	VIC	Within listed place
Indigenous		
Western Tasmania Aboriginal Cultural Landscape	TAS	Listed place
Natural		
Tasmanian Wilderness	TAS	Listed place

Wetlands of International Importance (Ramsar Wetlands)	[Resource Information]
Ramsar Site Name	Proximity
Corner inlet	Within Ramsar site
Gippsland lakes	Within 10km of Ramsar site
Glenelg estuary and discovery bay wetlands	Within Ramsar site
Lavinia	Within Ramsar site
Piccaninnie ponds karst wetlands	Within 10km of Ramsar site
Port phillip bay (western shoreline) and bellarine peninsula	Within Ramsar site
Western port	Within Ramsar site

Commonwealth Marine Area	[Resource Information]

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

Feature Name
Commonwealth Marine Areas (EPBC Act)

Feature Name
Commonwealth Marine Areas (EPBC Act)

Commonwealth Marine Areas (EPBC Act)

Listed Threatened Ecological Communities [Resource Information]

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

Community Name	Threatened Category	Presence Text
Alpine Sphagnum Bogs and Associated Fens	Endangered	Community may occur within area
Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community	Endangered	Community likely to occur within area
Giant Kelp Marine Forests of South East Australia	Endangered	Community may occur within area
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	Critically Endangered	Community known to occur within area
Karst springs and associated alkaline fens of the Naracoorte Coastal Plain Bioregion	Endangered	Community may occur within area
Lowland Native Grasslands of Tasmania	Critically Endangered	Community likely to occur within area
Natural Damp Grassland of the Victorian Coastal Plains	Critically Endangered	Community likely to occur within area
Natural Temperate Grassland of the Victorian Volcanic Plain	Critically Endangered	Community may occur within area
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically Endangered	Community likely to occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area
Tasmanian Forests and Woodlands dominated by black gum or Brookers gum (Eucalyptus ovata / E. brookeriana)	Critically Endangered	Community likely to occur within area
Tasmanian white gum (Eucalyptus viminalis) wet forest	Critically Endangered	Community likely to occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

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

Scientific Name	Threatened Category	Presence Text
BIRD		
Acanthiza pusilla magnirostris King Island Brown Thornbill, Brown Thornbill (King Island) [91709]	Endangered	Species or species habitat known to occur within area
Acanthornis magna greeniana King Island Scrubtit, Scrubtit (King Island) [82329]	Critically Endangered	Species or species habitat known to occur within area
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat known to occur within area
Aquila audax fleayi Tasmanian Wedge-tailed Eagle, Wedge-tailed Eagle (Tasmanian) [64435]	Endangered	Breeding likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Calyptorhynchus banksii graptogyne South-eastern Red-tailed Black-Cockatoo [25982]	Endangered	Species or species habitat likely to occur within area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat may occur within area
Ceyx azureus diemenensis Tasmanian Azure Kingfisher [25977]	Endangered	Breeding known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat may occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Platycercus caledonicus brownii Green Rosella (King Island) [67041]	Vulnerable	Species or species habitat known to occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Breeding known to occur within area
Pycnoptilus floccosus Pilotbird [525]	Vulnerable	Species or species habitat known to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area
Strepera fuliginosa colei Black Currawong (King Island) [67113]	Vulnerable	Breeding likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Breeding known to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thinornis cucullatus cucullatus		
Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area
Tyto novaehollandiae castanops (Tasmanian population)		
Masked Owl (Tasmanian) [67051]	Vulnerable	Breeding known to occur within area
CRUSTACEAN		
Astacopsis gouldi		
Giant Freshwater Crayfish, Tasmanian Giant Freshwater Lobster [64415]	Vulnerable	Species or species habitat likely to occur within area
Euastacus bispinosus		
Glenelg Spiny Freshwater Crayfish, Pricklyback [81552]	Endangered	Species or species habitat likely to occur within area
FISH		
Brachiopsilus ziebelli		
Ziebell's Handfish, Waterfall Bay Handfish [83757]	Vulnerable	Species or species habitat likely to occur within area
Galaxiella pusilla		
Eastern Dwarf Galaxias, Dwarf Galaxias [56790]	Vulnerable	Species or species habitat known to occur within area
Hoplostethus atlanticus		
Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area
Nannoperca obscura		
Yarra Pygmy Perch [26177]	Vulnerable	Species or species habitat known to occur within area
Prototroctes maraena		
Australian Grayling [26179]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Rexea solandri (eastern Australian population)		
Eastern Gemfish [76339]	Conservation Dependent	Species or species habitat likely to occur within area
Seriolella brama		
Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area
Thunnus maccoyii		
Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area
Thymichthys politus		
Red Handfish [83756]	Critically Endangered	Species or species habitat may occur within area
FROG		
Litoria aurea		
Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area
Litoria raniformis		
Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area
INSECT		
Oreisplanus munionga larana		
Marrawah Skipper, Alpine Sedge Skipper, Alpine Skipper [77747]	Vulnerable	Species or species habitat known to occur within area
Synemon plana		
Golden Sun Moth [25234]	Vulnerable	Species or species habitat may occur within area
MAMMAL		
Antechinus minimus maritimus		
Swamp Antechinus (mainland) [83086]	Vulnerable	Species or species habitat known to occur within area
Balaenoptera borealis		
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Scientific Name	Threatened Category	Presence Text
Balaenoptera musculus		
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus		
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Dasyurus maculatus maculatus (Tasmanian population)		
Spotted-tail Quoll, Spot-tailed Quoll, Tiger Quoll (Tasmanian population) [75183]	Vulnerable	Species or species habitat known to occur within area
Eubalaena australis		
Southern Right Whale [40]	Endangered	Breeding known to occur within area
Isoodon obesulus obesulus		
Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat known to occur within area
Mastacomys fuscus mordicus		
Broad-toothed Rat (mainland), Tooarrana [87617]	Vulnerable	Species or species habitat known to occur within area
Miniopterus orianae bassanii		
Southern Bent-wing Bat [87645]	Critically Endangered	Breeding known to occur within area
Mirounga leonina		
Southern Elephant Seal [26]	Vulnerable	Breeding may occur within area
Neophoca cinerea		
Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area
Perameles gunnii gunnii		
Eastern Barred Bandicoot (Tasmania) [66651]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Perameles gunnii Victorian subspecies		
Eastern Barred Bandicoot (Mainland) [88020]	Endangered	Translocated population known to occur within area
Petauroides volans		
Greater Glider (southern and central) [254]	Endangered	Species or species habitat may occur within area
Petaurus australis australis		
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus trisulcatus		
Long-nosed Potoroo (southern mainland) [86367]	Vulnerable	Species or species habitat known to occur within area
Pseudomys fumeus		
Smoky Mouse, Konoom [88]	Endangered	Species or species habitat may occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat known to occur within area
Pseudomys shortridgei		
Heath Mouse, Dayang, Heath Rat [77]	Endangered	Species or species habitat known to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Sarcophilus harrisii		
Tasmanian Devil [299]	Endangered	Species or species habitat likely to occur within area
PLANT		
Amphibromus fluitans		
River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat known to occur within area
Astelia australiana		
Tall Astelia [10851]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Caladenia calcicola Limestone Spider-orchid [10065]	Vulnerable	Species or species habitat likely to occur within area
Caladenia colorata Coloured Spider-orchid, Small Western Spider-orchid, Painted Spider-orchid [54999]	Endangered	Species or species habitat likely to occur within area
Caladenia dienema Windswept Spider-orchid [64858]	Endangered	Species or species habitat known to occur within area
Caladenia hastata Melblom's Spider-orchid [16118]	Endangered	Species or species habitat likely to occur within area
Caladenia insularis French Island Spider-orchid [24372]	Vulnerable	Species or species habitat likely to occur within area
Caladenia orientalis Eastern Spider Orchid [83410]	Endangered	Species or species habitat known to occur within area
Caladenia ornata Ornate Pink Fingers [76213]	Vulnerable	Species or species habitat likely to occur within area
Caladenia robinsonii Frankston Spider-orchid [24375]	Endangered	Species or species habitat likely to occur within area
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat known to occur within area
Centrolepis pedderensis Pedder Centrolepis, Pedder Bristlewort [12647]	Endangered	Species or species habitat likely to occur within area
Commersonia prostrata Dwarf Kerrawang [87152]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Corunastylis brachystachya Short-spiked Midge-orchid, Rocky Cape Midge Orchid [76410]	Endangered	Species or species habitat known to occur within area
Craspedia preminghana Preminghana Billybutton [77046]	Endangered	Species or species habitat likely to occur within area
Dianella amoena Matted Flax-lily [64886]	Endangered	Species or species habitat likely to occur within area
Diuris lanceolata Snake Orchid [10231]	Endangered	Species or species habitat known to occur within area
Dodonaea procumbens Trailing Hop-bush [12149]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus strzeleckii Strzelecki Gum [55400]	Vulnerable	Species or species habitat known to occur within area
Euphrasia collina subsp. muelleri Purple Eyebright, Mueller's Eyebright [16151]	Endangered	Species or species habitat known to occur within area
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat known to occur within area
Grevillea infecunda Anglesea Grevillea [22026]	Vulnerable	Species or species habitat known to occur within area
Haloragis exalata subsp. exalata Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat known to occur within area
Hiya distans listed as Hypolepis distans Scrambling Ground-fern [92548]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Ixodia achillaeoides subsp. arenicola Sand Ixodia, Ixodia [21474]	Vulnerable	Species or species habitat known to occur within area
Lachnagrostis adamsonii Adamson's Blown-grass, Adamson's Blowngrass [76211]	Endangered	Species or species habitat may occur within area
Leiocarpa gatesii Wrinkled Buttons [76212]	Vulnerable	Species or species habitat likely to occur within area
Lepidium aschersonii Spiny Peppercress [10976]	Vulnerable	Species or species habitat likely to occur within area
Lepidium hyssopifolium Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed [16542]	Endangered	Species or species habitat known to occur within area
Leucochrysum albicans subsp. tricolor Hoary Sunray, Grassland Paper-daisy [89104]	Endangered	Species or species habitat may occur within area
Lomatia tasmanica King's Lomatia [3745]	Critically Endangered	Species or species habitat likely to occur within area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat may occur within area
Pimelea spinescens subsp. spinescens Plains Rice-flower, Spiny Rice-flower, Prickly Pimelea [21980]	Critically Endangered	Species or species habitat likely to occur within area
Prasophyllum atratum Three Hummock Leek-orchid [82677]	Critically Endangered	Species or species habitat known to occur within area
Prasophyllum diversiflorum Gorae Leek-orchid [13210]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Prasophyllum favonium Western Leek-orchid [64949]	Critically Endangered	Species or species habitat known to occur within area
Prasophyllum frenchii Maroon Leek-orchid, Slaty Leek-orchid, Stout Leek-orchid, French's Leek-orchid, Swamp Leek-orchid [9704]	Endangered	Species or species habitat known to occur within area
Prasophyllum litorale listed as Prasophyllum littorale Coastal Leek Orchid [55234]	Critically Endangered	Species or species habitat known to occur within area
Prasophyllum pulchellum Pretty Leek-orchid [64953]	Critically Endangered	Species or species habitat known to occur within area
Prasophyllum secutum Northern Leek-orchid [64954]	Endangered	Species or species habitat likely to occur within area
Prasophyllum spicatum Dense Leek-orchid [55146]	Vulnerable	Species or species habitat known to occur within area
Pseudocephalozia paludicola Alpine Leafy Liverwort [66441]	Vulnerable	Species or species habitat known to occur within area
Pterostylis chlorogramma Green-striped Greenhood [56510]	Vulnerable	Species or species habitat likely to occur within area
Pterostylis cucullata Leafy Greenhood [15459]	Vulnerable	Species or species habitat known to occur within area
Pterostylis rubenachii Arthur River Greenhood [64536]	Endangered	Species or species habitat known to occur within area
Pterostylis tenuissima Swamp Greenhood, Dainty Swamp Orchid [13139]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Pterostylis ziegeleri		
Grassland Greenhood, Cape Portland Greenhood [64971]	Vulnerable	Species or species habitat likely to occur within area
Senecio macrocarpus		
Large-fruit Fireweed, Large-fruit Groundsel [16333]	Vulnerable	Species or species habitat likely to occur within area
Senecio psilocarpus		
Swamp Fireweed, Smooth-fruited Groundsel [64976]	Vulnerable	Species or species habitat known to occur within area
Taraxacum cygnorum		
Coast Dandelion, Native Dandelion [2508]	Vulnerable	Species or species habitat may occur within area
Thelymitra epipactoides		
Metallic Sun-orchid [11896]	Endangered	Species or species habitat known to occur within area
Thelymitra matthewsii		
Spiral Sun-orchid [4168]	Vulnerable	Species or species habitat known to occur within area
Thelymitra orientalis		
Hoary Sun-orchid [88011]	Critically Endangered	Species or species habitat known to occur within area
Thesium australe		
Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Xerochrysum palustre		
Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat known to occur within area
REPTILE		
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Delma impar		
Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Lissolepis coventryi		
Swamp Skink, Eastern Mourning Skink [84053]	Endangered	Species or species habitat known to occur within area
SHARK		
Carcharodon carcharias		
White Shark, Great White Shark [64470]	Vulnerable	Breeding known to occur within area
Centrophorus harrissoni		
Harrisson's Dogfish, Endeavour Dogfish, Dumb Gulper Shark, Harrison's Deepsea Dogfish [68444]	Conservation Dependent	Species or species habitat likely to occur within area
Centrophorus uyato		
Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area
Galeorhinus galeus		
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat likely to occur within area
Rhincodon typus		
Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Zearaja maugeana		
Maugean Skate, Port Davey Skate [83504]	Endangered	Species or species habitat known to occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Anous stolidus		
Common Noddy [825]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur within area
Ardenna grisea Sooty Shearwater [82651]		Breeding known to occur within area
Ardenna tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Hydroprogne caspia Caspian Tern [808]		Breeding known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Sternula albifrons Little Tern [82849]		Breeding known to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Breeding known to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Migratory Marine Species		
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Breeding known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area

Scientific Name	Threatened Category	Presence Text
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Eubalaena australis as Balaena glacialis australis		
Southern Right Whale [40]	Endangered	Breeding known to occur within area
Isurus oxyrinchus		
Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area
Lagenorhynchus obscurus		
Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lamna nasus		
Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae		
Humpback Whale [38]		Species or species habitat known to occur within area
Orcinus orca		
Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus		
Sperm Whale [59]		Species or species habitat may occur within area
Rhincodon typus		
Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Migratory Terrestrial Species		
Hirundapus caudacutus		
White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Breeding known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Species or species habitat known to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Roosting known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area

Scientific Name	Threatened Category	Presence Text
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Phalaropus lobatus Red-necked Phalarope [838]		Roosting known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Roosting known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area
Thalasseus bergii Greater Crested Tern [83000]		Breeding known to occur within area
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area
Tringa incana Wandering Tattler [831]		Roosting known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Roosting known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

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

Commonwealth Land Name	State
Defence	
Defence - CROWS NEST CAMP - QUEENSCLIFF [21029]	VIC
Defence - CROWS NEST CAMP - QUEENSCLIFF [21028]	VIC
Defence - CROWS NEST CAMP - QUEENSCLIFF [21026]	VIC
Defence - CROWS NEST CAMP - QUEENSCLIFF [21027]	VIC
Defence - HMAS CERBERUS [20099]	VIC
Defence - HMAS CERBERUS [20097]	VIC
Defence - HMAS CERBERUS [20092]	VIC
Defence - HMAS CERBERUS [20084]	VIC
Defence - HMAS CERBERUS [20103]	VIC
Defence - HMAS CERBERUS [20102]	VIC
Defence - HMAS CERBERUS [20100]	VIC
Defence - HMAS CERBERUS [20101]	VIC
Defence - HMAS CERBERUS [20104]	VIC
Defence - HMAS CERBERUS [20094]	VIC
Defence - HMAS CERBERUS [20096]	VIC
Defence - HMAS CERBERUS [20093]	VIC
Defence - HMAS CERBERUS [20091]	VIC
Defence - HMAS CERBERUS [20095]	VIC
Defence - HMAS CERBERUS [20090]	VIC
Defence - HMAS CERBERUS [20086]	VIC
Defence - HMAS CERBERUS [20081]	VIC
Defence - HMAS CERBERUS [20083]	VIC

Commonwealth Land Name	State
Defence - HMAS CERBERUS [20082]	VIC
Defence - HMAS CERBERUS [20087]	VIC
Defence - HMAS CERBERUS [20088]	VIC
Defence - HMAS CERBERUS [20089]	VIC
Defence - HMAS CERBERUS [20085]	VIC
Defence - STAFF COLLEGE-FORT QUEENSCLIFF [21030]	VIC
Defence - STAFF COLLEGE-FORT QUEENSCLIFF [21033]	VIC
Defence - STAFF COLLEGE-FORT QUEENSCLIFF [21032]	VIC
Defence - STAFF COLLEGE-FORT QUEENSCLIFF [21034]	VIC
Defence - STAFF COLLEGE-FORT QUEENSCLIFF [21031]	VIC
Defence - SWAN ISLAND TRAINING AREA [21446]	VIC
Defence - SWAN ISLAND TRAINING AREA [21447]	VIC
Defence - SWAN ISLAND TRAINING AREA [21448]	VIC
Defence - TRAINING CENTRE (Norris Barracks) - Portsea [21025]	VIC
Defence - Training Depot, Darts RD 3305 Portland [21016]	VIC
Defence - WARRNAMBOOL TRAINING DEPOT [21111]	VIC
Defence - WEST HEAD GUNNERY RANGE [21112]	VIC
Unknown	
Commonwealth Land - [21489]	VIC
Commonwealth Land - [60116]	TAS
Commonwealth Land - [60112]	TAS
Commonwealth Land - [60115]	TAS
Commonwealth Land - [60111]	TAS
Commonwealth Land - [21490]	VIC
Commonwealth Land - [21492]	VIC
Commonwealth Land - [21509]	VIC
Commonwealth Land - [60113]	TAS

Commonwealth Land Name	State
Commonwealth Land - [21583]	VIC
Commonwealth Land - [60114]	TAS
Commonwealth Land - [60117]	TAS
Commonwealth Land - [21488]	VIC
Commonwealth Land - [21491]	VIC
Commonwealth Land - [22391]	VIC
Commonwealth Land - [21570]	VIC
Commonwealth Land - [21487]	VIC
Commonwealth Land - [21582]	VIC
Commonwealth Land - [60346]	TAS

Commonwealth Heritage Places [Resource Information]

Name	State	Status
Historic		
Cape Sorell Lighthouse	TAS	Listed place
Cape Wickham Lighthouse	TAS	Listed place
Fort Queenscliff	VIC	Listed place
Sorrento Post Office	VIC	Listed place
Swan Island Defence Precinct	VIC	Listed place
Wilsons Promontory Lighthouse	VIC	Listed place
Natural		
HMAS Cerberus Marine and Coastal Area	VIC	Listed place
Swan Island and Naval Waters	VIC	Listed place

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur within area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]		Breeding known to occur within area
Ardenna tenuirostris as Puffinus tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area overfly marine area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area overfly marine area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat known to occur within area overfly marine area
Chroicocephalus novaehollandiae as Larus novaehollandiae Silver Gull [82326]		Breeding known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea antipodensis gibsoni as Diomedea gibsoni		
Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora		
Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans		
Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi		
Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Eudyptula minor		
Little Penguin [1085]		Breeding known to occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area overfly marine area
Gallinago megala		
Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area
Gallinago stenura		
Pin-tailed Snipe [841]		Species or species habitat known to occur within area overfly marine area
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Breeding known to occur within area
Halobaena caerulea		
Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Hydroprogne caspia as Sterna caspia Caspian Tern [808]		Breeding known to occur within area
Larus dominicanus Kelp Gull [809]		Breeding known to occur within area
Larus pacificus Pacific Gull [811]		Breeding known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Limicola falcinellus Broad-billed Sandpiper [842]		Roosting known to occur within area overfly marine area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area overfly marine area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area
Morus capensis Cape Gannet [59569]		Breeding known to occur within area
Morus serrator Australasian Gannet [1020]		Breeding known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area overfly marine area
Myiagra cyanoleuca Satin Flycatcher [612]		Breeding known to occur within area overfly marine area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Breeding known to occur within area overfly marine area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
Onychoprion fuscatus as Sterna fuscata Sooty Tern [90682]		Breeding known to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Pelagodroma marina White-faced Storm-Petrel [1016]		Breeding known to occur within area
Pelecanoides urinatrix Common Diving-Petrel [1018]		Breeding known to occur within area
Phalacrocorax fuscescens Black-faced Cormorant [59660]		Breeding known to occur within area
Phalaropus lobatus Red-necked Phalarope [838]		Roosting known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Roosting known to occur within area overfly marine area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area overfly marine area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Breeding known to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Breeding known to occur within area
Sternula nereis as Sterna nereis Fairy Tern [82949]		Breeding known to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Breeding known to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thalasseus bergii as Sterna bergii Greater Crested Tern [83000]		Breeding known to occur within area
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area
Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Tringa brevipes as Heteroscelus brevipes Grey-tailed Tattler [851]		Roosting known to occur within area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Tringa incana as Heteroscelus incanus		
Wandering Tattler [831]		Roosting known to occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area overfly marine area
Tringa stagnatilis		
Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area
Xenus cinereus		
Terek Sandpiper [59300]		Roosting known to occur within area overfly marine area
Fish		
Heraldia nocturna		
Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus abdominalis		
Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus breviceps		
Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Hippocampus minotaur		
Bullneck Seahorse [66705]		Species or species habitat may occur within area
Histiogamphelus briggsii		
Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
Histiogamphelus cristatus		
Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Hypselognathus rostratus		
Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area
Kimblaeus bassensis Trawl Pipefish, Bass Strait Pipefish [66247]		Species or species habitat may occur within area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Mitotichthys mollisoni Mollison's Pipefish [66260]		Species or species habitat may occur within area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammal		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Breeding known to occur within area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Breeding known to occur within area
Mirounga leonina Southern Elephant Seal [26]	Vulnerable	Breeding may occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area
Reptile		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area

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

Current Scientific Name	Status	Type of Presence
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Berardius arnuxii Arnoux's Beaked Whale [70]		Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Hyperoodon planifrons Southern Bottlenose Whale [71]		Species or species habitat may occur within area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area
Tasmacetus shepherdi Shepherd's Beaked Whale, Tasman Beaked Whale [55]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area

Critical Habitats

[Resource Information]

Name	Type of Presence
Thalassarche cauta (Shy Albatross) - Albatross Island, The Mewstone, Pedra Branca	Listed Critical Habitat

Australian Marine Parks

[Resource Information]

Park Name	Zone & IUCN Categories
Tasman Fracture	Marine National Park Zone (IUCN II)
Apollo	Multiple Use Zone (IUCN VI)
Beagle	Multiple Use Zone (IUCN VI)

Park Name	Zone & IUCN Categories
Boags	Multiple Use Zone (IUCN VI)
Franklin	Multiple Use Zone (IUCN VI)
Tasman Fracture	Multiple Use Zone (IUCN VI)
Zeehan	Multiple Use Zone (IUCN VI)
Nelson	Special Purpose Zone (IUCN VI)
Zeehan	Special Purpose Zone (IUCN VI)

Extra Information

State and Territory Reserves

[Resource Information]

Protected Area Name	Reserve Type	State
Aire River	Heritage River	VIC
Aire River W.R.	Natural Features Reserve	VIC
Albatross Island	Nature Reserve	TAS
Anglesea B.R.	Natural Features Reserve	VIC
Anser Island	Reference Area	VIC
Arthur-Pieman	Conservation Area	TAS
Arthur River Rd Marrawah	Conservation Covenant	TAS
Badger Box Creek	Nature Reserve	TAS
Badger River	Regional Reserve	TAS
Bald Hills B.R.	Natural Features Reserve	VIC
Barham Paradise S.R.	Natural Features Reserve	VIC
Barwon Bluff	Marine Sanctuary	VIC
Bass Pyramid	Nature Reserve	TAS
Bats Ridge W.R	Nature Conservation Reserve	VIC
Bay of Islands Coastal Park	Conservation Park	VIC

Protected Area Name	Reserve Type	State
Bernafai Ridge	Conservation Area	TAS
Bird Island	Game Reserve	TAS
Black Pyramid Rock	Nature Reserve	TAS
Bond Tier	Regional Reserve	TAS
Bunurong	Marine National Park	VIC
Bunurong Marine Park	National Parks Act Schedule 4 park or reserve	VIC
Calder River	Reference Area	VIC
Calm Bay	State Reserve	TAS
Cape Liptrap Coastal Park	Conservation Park	VIC
Cape Nelson	State Park	VIC
Cape Patterson N.C.R	Natural Features Reserve	VIC
Cape Sorell	Historic Site	TAS
Cape Wickham	Conservation Area	TAS
Cape Wickham	State Reserve	TAS
Cataraqui Point	Conservation Area	TAS
Christmas Island	Nature Reserve	TAS
Churchill Island	Marine National Park	VIC
City of Melbourne Bay	Conservation Area	TAS
Colliers Forest Reserve	Conservation Covenant	TAS
Colliers Swamp	Conservation Area	TAS
Comeback Rd Marrawah	Conservation Covenant	TAS
Cone Islet	Conservation Area	TAS
Councillor Island	Nature Reserve	TAS
Counsel Hill	Conservation Area	TAS
Crib Point G228 B.R.	Natural Features Reserve	VIC

Protected Area Name	Reserve Type	State
Crib Point G229 B.R.	Natural Features Reserve	VIC
Crinoline Creek	Reference Area	VIC
Curdie Vale N.C.R.	Natural Features Reserve	VIC
Currie Lightkeepers Residence	Historic Site	TAS
Curtis Island	Nature Reserve	TAS
Deen Maar	Indigenous Protected Area	VIC
Deep Lagoons	Conservation Area	TAS
Devils Tower	Nature Reserve	TAS
Disappointment Bay	State Reserve	TAS
Discovery Bay	Marine National Park	VIC
Discovery Bay Coastal Park	Conservation Park	VIC
East Moncoeur Island	Conservation Area	TAS
Edna Bowman N.C.R.	Natural Features Reserve	VIC
Eldorado	Conservation Area	TAS
Fingal B.R	Natural Features Reserve	VIC
Flinders G234 B.R.	Natural Features Reserve	VIC
Flinders N.F.R.	Natural Features Reserve	VIC
Four Mile Beach	Regional Reserve	TAS
French Island	National Park	VIC
Gentle Annie	Conservation Area	TAS
Goose Lagoon W.R	Natural Features Reserve	VIC
Great Otway	National Park	VIC
Harbour Islets	Conservation Area	TAS
Harcus River Rd West Montagu	Conservation Covenant	TAS

Protected Area Name	Reserve Type	State
Harcus River Road	NRS Addition - Gazettal in Progress	TAS
Harcus River Road #4	Conservation Covenant	TAS
Harcus River Road Marrawah	Conservation Covenant	TAS
Hedditch Hill S.R.	Natural Features Reserve	VIC
Henderson Islets	Conservation Area	TAS
Hogan Group	Conservation Area	TAS
Hunter Island	Conservation Area	TAS
Jack Smith Lake W.R	Natural Features Reserve	VIC
Johanna Falls S.R.	Natural Features Reserve	VIC
Kentford Forest	Nature Reserve	TAS
Kentford Forest	Conservation Area	TAS
Kentford Rd Nugara	Conservation Covenant	TAS
Kent Group	National Park	TAS
Kilcunda N.C.R.	Natural Features Reserve	VIC
Kings Run	Private Nature Reserve	TAS
Kings Run #2	Conservation Covenant	TAS
Lady Julia Percy Island W.R.	Nature Conservation Reserve	VIC
Lake Aringa W.R	Nature Conservation Reserve	VIC
Lake Connewarre W.R	Natural Features Reserve	VIC
Lake Denison W.R	Natural Features Reserve	VIC
Lake Gillear W.R	Natural Features Reserve	VIC
Latrobe B.R.	Natural Features Reserve	VIC

Protected Area Name	Reserve Type	State
Lavinia	State Reserve	TAS
Lawrence Rocks W.R.	Nature Conservation Reserve	VIC
Lily Lagoon	Nature Reserve	TAS
Little Trefoil	Conservation Area	TAS
Lonsdale Lakes W.R	Nature Conservation Reserve	VIC
Lower Glenelg	National Park	VIC
Lower South East	Marine Park	SA
Lymwood	Conservation Covenant	TAS
Main Ridge N.C.R.	Natural Features Reserve	VIC
Marengo N.C.R.	Nature Conservation Reserve	VIC
Marengo Reefs	Marine Sanctuary	VIC
Merri	Marine Sanctuary	VIC
Millwood Road	Conservation Covenant	TAS
Mornington Peninsula	National Park	VIC
Mount Dundas	Regional Reserve	TAS
Mount Heemskirk	Regional Reserve	TAS
Mount Richmond	National Park	VIC
Mount Vereker Creek	Natural Catchment Area	VIC
Muddy Lagoon	Nature Reserve	TAS
Murkay Islets	Conservation Area	TAS
Mushroom Reef	Marine Sanctuary	VIC
Nares Rocks	Conservation Area	TAS
New Year Island	Game Reserve	TAS
Ninety Mile Beach	Marine National Park	VIC
Nooramunga Marine & Coastal Park	National Parks Act Schedule 4 park or	VIC

Protected Area Name	Reserve Type	State
	reserve	
North East Islet	Nature Reserve	TAS
Ocean Beach	Conservation Area	TAS
Parker River	Reference Area	VIC
Pegarah	Private Nature Reserve	TAS
Pegarah Forest	Conservation Covenant	TAS
Pegarah Rd King Island	Conservation Covenant	TAS
Phillip Island Nature Park	Other	VIC
Pieman River	State Reserve	TAS
Point Addis	Marine National Park	VIC
Point Danger	Marine Sanctuary	VIC
Point Nepean	National Park	VIC
Porky Beach	Conservation Area	TAS
Port Campbell	National Park	VIC
Portland H46 B.R.	Natural Features Reserve	VIC
Portland H47 B.R.	Natural Features Reserve	VIC
Port Phillip Heads	Marine National Park	VIC
Preminghana	Indigenous Protected Area	TAS
Princetown W.R	Natural Features Reserve	VIC
Queenscliff N.F.R	Natural Features Reserve	VIC
Rebecca Creek	Conservation Area	TAS
Red Hut Point	Conservation Area	TAS
Red Hut Road #1	Conservation Covenant	TAS
Red Hut Road #2	Conservation Covenant	TAS
Reef Island and Bass River Mouth N.C.R	Natural Features Reserve	VIC

Protected Area Name	Reserve Type	State
Reekara Road #1	Conservation Covenant	TAS
Reekara Road #2	Conservation Covenant	TAS
Reid Rocks	Nature Reserve	TAS
Rodondo Island	Nature Reserve	TAS
Salt Lagoon, St Leonards W.R	Nature Conservation Reserve	VIC
Sartoris Rd Nugara	Conservation Covenant	TAS
Seacrow Islet	Conservation Area	TAS
Sea Elephant	Conservation Area	TAS
Sea Elephant Bootlace	Conservation Covenant	TAS
Sea Elephant River	Conservation Covenant	TAS
Seal Islands W.R.	Nature Conservation Reserve	VIC
Seal Rocks	Conservation Area	TAS
Seal Rocks	State Reserve	TAS
Shell Islets	Conservation Area	TAS
Slaves Bay	Conservation Area	TAS
Southern Wilsons Promontory	Remote and Natural Area - Schedule 6, National Parks Act	VIC
South Rd Nugara	Conservation Covenant	TAS
Southwest	National Park	TAS
Southwest	Conservation Area	TAS
Stack Island	Game Reserve	TAS
Stokes Point	Conservation Area	TAS
Stony Creek (Otways)	Reference Area	VIC
Strahan Customs House	Historic Site	TAS
Sugarloaf Rock	Conservation Area	TAS
Sundown Point	State Reserve	TAS

Protected Area Name	Reserve Type	State
Swan Bay - Edwards Point W.R	Nature Conservation Reserve	VIC
Tambar	Conservation Covenant	TAS
Tathams Lagoon	Conservation Area	TAS
Teepookana	Regional Reserve	TAS
Temma	Conservation Covenant	TAS
The Arches	Marine Sanctuary	VIC
The Doughboys	Nature Reserve	TAS
Three Hummock Island	State Reserve	TAS
Tikkawoppa Plateau	Regional Reserve	TAS
Tin Mine Rd Loorana	Conservation Covenant	TAS
Tower Hill W.R	Natural Features Reserve	VIC
Trewalla H48 B.R.	Natural Features Reserve	VIC
Trewalla H49 B.R.	Natural Features Reserve	VIC
Trial Harbour	State Reserve	TAS
Tully River	Conservation Area	TAS
Twelve Apostles	Marine National Park	VIC
Unnamed P0176	Private Nature Reserve	VIC
Ventnor B.R.	Natural Features Reserve	VIC
Vereker Creek	Reference Area	VIC
Waratah B.R	Natural Features Reserve	VIC
Warra Creek	Regional Reserve	TAS
Welcome River	State Reserve	TAS
Welcome Swamp	Conservation Covenant	TAS
West Moncoeur Island	Nature Reserve	TAS

Protected Area Name	Reserve Type	State
West Point	State Reserve	TAS
Wicks Road Nugara	Conservation Covenant	TAS
Wild Dog B.R.	Natural Features Reserve	VIC
Wild Dog Creek SS.R.	Natural Features Reserve	VIC
Wilsons Promontory	National Park	VIC
Wilsons Promontory	Wilderness Zone	VIC
Wilsons Promontory	Marine National Park	VIC
Wilsons Promontory Islands	Remote and Natural Area - Schedule 6, National Parks Act	VIC
Wilsons Promontory Marine Park	National Parks Act Schedule 4 park or reserve	VIC
Wilsons Promontory Marine Reserve	National Parks Act Schedule 4 park or reserve	VIC
Wongarra B.R.	Natural Features Reserve	VIC
Wonthaggi G237 B.R.	Natural Features Reserve	VIC
Wonthaggi G238 B.R.	Natural Features Reserve	VIC
Wonthaggi G239 B.R.	Natural Features Reserve	VIC
Wonthaggi G240 B.R.	Natural Features Reserve	VIC
Wonthaggi G241 B.R.	Natural Features Reserve	VIC
Wonthaggi Heathlands N.C.R	Natural Features Reserve	VIC
Yambacoona	Conservation Covenant	TAS
Yambuk F.F.R.	Nature Conservation Reserve	VIC

Regional Forest Agreements [Resource Information]

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

RFA Name	State
Gippsland RFA	Victoria
Tasmania RFA	Tasmania
West Victoria RFA	Victoria

Nationally Important Wetlands [Resource Information]

Wetland Name	State
Aire River	VIC
Anderson Inlet	VIC
Bungaree Lagoon	TAS
Corner Inlet	VIC
Jack Smith Lake State Game Reserve	VIC
Lake Ashwood	TAS
Lake Bantick	TAS
Lake Connewarre State Wildlife Reserve	VIC
Lake Flannigan	TAS
Lake Garcia	TAS
Lavinia Nature Reserve	TAS
Lower Aire River Wetlands	VIC
Lower Merri River Wetlands	VIC
Mud Islands	VIC
Pearshape Lagoon 1	TAS
Pearshape Lagoon 2	TAS
Pearshape Lagoon 3	TAS
Pearshape Lagoon 4	TAS
Powlett River Mouth	VIC

Wetland Name	State
Princetown Wetlands	VIC
Swan Bay & Swan Island	VIC
Tower Hill	VIC
Unnamed Wetland	TAS
Western Port	VIC
Yambuk Wetlands	VIC

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Apollo Bay to Skenes Creek Coastal Trail	2022/09274		Assessment
Blue Marlin Offshore Wind Energy Project	2023/09532		Referral Decision
Greater Gippsland Offshore Wind Project	2022/09379		Assessment
Greater Gippsland Offshore Wind Project Initial Marine Field Investigations	2022/09374		Completed
Offshore Tidal Energy Facility and Submarine Cable	2008/4480		Completed
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed
Seadragon Offshore Wind Farm	2022/9163		Assessment
Southern Winds Offshore Wind Project	2022/09435		Assessment
Southern Winds Offshore Wind Project Initial Marine Field Investigations	2022/09436		Completed
Spinifex Offshore Surveys	2022/09359		Completed
Controlled action			
Alston-1 petroleum exploration well, permit VIC/P44	2003/1315	Controlled Action	Post-Approval
Bald Hills Wind Farm 80 Turbines	2002/730	Controlled Action	Post-Approval
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
City Of Greater Geelong Mosquito Control Program 2021-2030, Vic	2020/8782	Controlled Action	Further Information Request
Crib Point to Pakenham Gas Pipeline, Vic	2018/8297	Controlled Action	Completed
Dairy Farm expansion on the Woolnorth property	2013/6710	Controlled Action	Completed
DPIPWE - Arthur-Pieman Conservation Area - off-road vehicle mitigation actions	2017/8038	Controlled Action	Completed
Establishment of plantation for use of effluent water	2003/1063	Controlled Action	Completed
Gas Import Facility, Crib Point, Vic	2018/8298	Controlled Action	Completed
Gippsland Regional Port Project	2020/8667	Controlled Action	Assessment Approach
Heemskirk Windfarm Development	2002/678	Controlled Action	Completed
Kentbruck Green Power Hub, Vic	2019/8510	Controlled Action	Assessment Approach
Lonsdale Golf Club Redevelopment	2003/969	Controlled Action	Post-Approval
Mosquito Control	2005/2132	Controlled Action	Post-Approval
Otway Development	2002/621	Controlled Action	Post-Approval
Pacific Hydro (Portland) Wind Farm SW Victoria	2000/18	Controlled Action	Post-Approval
Port Phillip Bay Channel Deepening	2002/576	Controlled Action	Post-Approval
Redevelopment of post office and construction of dwellings	2007/3639	Controlled Action	Completed
Residential and Golf Course Development Project	2003/1144	Controlled Action	Post-Approval
Residential Subdivision & Infrastructure Parish of Belfast	2005/1954	Controlled Action	Completed
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Star of the South Offshore Wind Farm Project	2020/8650	Controlled Action	Guidelines Issued
Strike Oil Gas Exploration Well, Otway Basin (VIC/P44)	2000/97	Controlled Action	Completed
Tarkine Forest Drive Road Upgrade	2011/6210	Controlled Action	Post-Approval
The Tarkine Road Project	2009/5169	Controlled Action	Completed
Twelve Apostles Saddle Lookout	2019/8571	Controlled Action	Post-Approval
VIC Offshore Windfarm	2021/8966	Controlled Action	Assessment Approach
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed
Victorian Desalination Project, Bass Coast	2008/3948	Controlled Action	Post-Approval
Wind Farm Construction	2000/12	Controlled Action	Post-Approval
Wind Turbines	2001/439	Controlled Action	Completed
Yolla Gas Field (TRL1) Development	2001/321	Controlled Action	Post-Approval
Not controlled action			
2004/2005 drilling program for exploration and production (VIC 01-06, 09-11, 16, 18 & 19 and VIC/RL	2003/1282	Not Controlled Action	Completed
2D seismic survey, Petroleum Exploration Permit Area T/36P	2004/1787	Not Controlled Action	Completed
2D seismic Survey in VIC/P55, VIC/RL2 and VIC/P41	2004/1876	Not Controlled Action	Completed
accomodation units and associatedadministration and recreational facilities	2001/430	Not Controlled Action	Completed
Airey Inlet water reclamation plant to Anglesea sewerage system	2006/2539	Not Controlled Action	Completed
Alteration of Grass Maintenance Regime within Powling St Wetlands	2012/6527	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Amrit-1 exploration well	2004/1572	Not Controlled Action	Completed
Anglesea Mine South Wall Vegetation removal, Anglesea, Vic	2017/8060	Not Controlled Action	Completed
Apollo Bay Water Storage Basin, VIC	2012/6484	Not Controlled Action	Completed
Barwon Heads Rd gas pipeline installation	2006/2769	Not Controlled Action	Completed
Barwon Heads Stormwater Outfall upgrade, Victoria	2016/7650	Not Controlled Action	Completed
Beardie-1 Field wildcat oil well	2001/505	Not Controlled Action	Completed
Bluff Heights Estate Stages 2 to 4	2003/1047	Not Controlled Action	Completed
Boneo Park Equestrian Centre	2008/4639	Not Controlled Action	Completed
Capture of Juvenile Tasmanian Devils for Conservation Purposes	2007/3261	Not Controlled Action	Completed
Capture of Tasmanian Devils from Disease-Free Areas	2007/3883	Not Controlled Action	Completed
CO2 geosequestration - Otway Basin Pilot Project	2006/2699	Not Controlled Action	Completed
Communications tower extension	2003/1099	Not Controlled Action	Completed
Construct a Recycled Water Pipeline from Somers Treatment Plant to Blue Scope S	2009/4982	Not Controlled Action	Completed
Construction of Barwon Heads Bridge	2005/2375	Not Controlled Action	Completed
Construction of Infrastructure to Extract, Treat & Transfer Groundwater to Wurde	2008/4104	Not Controlled Action	Completed
construction of pump station for pump diversion from the Barham River	2003/1242	Not Controlled Action	Completed
Construction of the Edgars Road Extension, from Childs Road, Lalor to Cooper Street, Epping	2003/1135	Not Controlled Action	Completed
Cowes Primary School Gymnasium	2020/8683	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Development of Kipper gas field within Vic/L3, Vic/L4 Vic/RL2	2005/2484	Not Controlled Action	Completed
Development of Pt Nepean Quarantine Station (former) National Centre for Coasts and Climate	2008/4653	Not Controlled Action	Completed
Development of Turrum Oil Field and associated infrastructure	2003/1204	Not Controlled Action	Completed
Divestment of Norris Barracks	2003/963	Not Controlled Action	Completed
Drilling and side track completion at Baleen gas production well in Production Licence area VIC/L21	2004/1535	Not Controlled Action	Completed
Drilling of Callister-1 exploration well in VIC/P51	2004/1633	Not Controlled Action	Completed
Enterprise 1 Exploration Drilling Program, near Port Campbell, Vic	2019/8438	Not Controlled Action	Completed
Establishment of a 6 turbine windfarm near Wonthaggi	2002/820	Not Controlled Action	Completed
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed
Exploration Drilling Well Trefoil-1	2003/1058	Not Controlled Action	Completed
Fabrication and Spooling of Pipe Strings at Crib Point	2008/4127	Not Controlled Action	Completed
Ferry Service Infrastructure Development	2001/269	Not Controlled Action	Completed
Flinders Backlog Sewer Project	2005/2275	Not Controlled Action	Completed
Gas Field Development	2006/2635	Not Controlled Action	Completed
Gas Fields Development	2011/5879	Not Controlled Action	Completed
Gas Pipeline Installation	2005/2495	Not Controlled Action	Completed
Gippsland Basin Seismic Programme	2004/1866	Not Controlled Action	Completed
Golflinks Road Residential Development & Water Storage Facility at Barwon Heads	2004/1793	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Grevillea infecunda tip cuttings and soil samples	2005/1979	Not Controlled Action	Completed
Halladale and Speculant Gas Pipeline Project, North of Port Campbell, Vic	2015/7551	Not Controlled Action	Completed
Hemingway1/Oil Exploration	2001/177	Not Controlled Action	Completed
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed
Huxley Hill Wind Farm expansion	2005/2499	Not Controlled Action	Completed
Huxley Hill Wind Farm Expansion	2002/570	Not Controlled Action	Completed
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
Installation of a 35 metre telecommunications facility at Jirrahlinga Animal San	2003/1151	Not Controlled Action	Completed
Installation of optic fibre cable from Inverloch, Victoria to Stanley, Tasmania	2002/906	Not Controlled Action	Completed
Kelly Swamp Boardwalk Construction	2010/5371	Not Controlled Action	Completed
Longtom-3 Gas Appraisal Well, VIC/P54	2005/2494	Not Controlled Action	Completed
Longtom Gas Pipeline Development, VIC/P54	2006/3072	Not Controlled Action	Completed
Maintenance and priority works to heritage buildings at Point Nepean Quarantine	2006/3151	Not Controlled Action	Completed
Maintenance dredging of Yaringa Channel	2004/1360	Not Controlled Action	Completed
Maintenance Dredging South Channel 2012	2011/6198	Not Controlled Action	Completed
Maintenance of Access Track and Weed Removal	2009/4973	Not Controlled Action	Completed
Maintenance works at Barwon Heads Bridge	2003/1199	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Marine and Freshwater Resources Institute (MAFRI) Facility	2000/121	Not Controlled Action	Completed
Marlin-Snapper Gas Pipeline Project	2006/3197	Not Controlled Action	Completed
Melville 1 Oil Exploration Well	2001/167	Not Controlled Action	Completed
Merricks Beach Backlog Sewer Project	2010/5300	Not Controlled Action	Completed
Millwood Road Gravel Quarry	2002/602	Not Controlled Action	Completed
Minerva Cut Back Project, Vic	2017/8036	Not Controlled Action	Completed
Newfield wind farm	2007/3226	Not Controlled Action	Completed
Newhaven Yacht Squadron marina extension	2004/1450	Not Controlled Action	Completed
New Water Infrastructure Upgrade, Grassy Dam, King Island	2013/6882	Not Controlled Action	Completed
Nirranda South Wind Farm Pty Ltd	2002/763	Not Controlled Action	Completed
Ocean Grove rising main 2 upgrade	2009/4978	Not Controlled Action	Completed
Ocean Grove Rising Main 2 Upgrade (OGRM2) - East Section & River Crossing	2010/5508	Not Controlled Action	Completed
Oceanlinx South Australia 1mW Greenwave Project	2012/6528	Not Controlled Action	Completed
Offshore exploration drilling within permit area VIC/P 37(v)	2004/1466	Not Controlled Action	Completed
Offshore Petroleum Exploration	2001/289	Not Controlled Action	Completed
Optic fibre cable installation - San Remo to Cowes	2005/2386	Not Controlled Action	Completed
Pipeline easement regrowth removal	2011/5817	Not Controlled Action	Completed
Point Nepean Quarantine Station (former)/Restoration of Medical Superintendent's	2006/3149	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Port Campbell Headland Walking Trail Realignment	2012/6676	Not Controlled Action	Completed
Portland Landfill Borehole Installation, Vic	2017/7886	Not Controlled Action	Completed
Port Phillip Channel Deepening Project - Trial Dredge Program	2005/2164	Not Controlled Action	Completed
Proposed replacement of existing road culvert	2013/7077	Not Controlled Action	Completed
Queenscliff Harbour Redevelopment	2004/1352	Not Controlled Action	Completed
Railway Bridge (H0151) Partial Demolition, Merri River	2010/5534	Not Controlled Action	Completed
Redevelopment Project to Upgrade and Extend the Portland Trawler Wharf	2008/4317	Not Controlled Action	Completed
Rehabilitation of Lake Connewarre State Game Reserve	2002/708	Not Controlled Action	Completed
Remedial Works to the Swan Island Bridge	2003/1129	Not Controlled Action	Completed
Remote power generation project	2005/2287	Not Controlled Action	Completed
Replacement of sewer pipelines	2002/623	Not Controlled Action	Completed
Residential/Resort/Golf Course development	2002/907	Not Controlled Action	Completed
Residential Development, 409 The Esplanade, St Leonards	2006/2950	Not Controlled Action	Completed
Residential Dwelling	2004/1896	Not Controlled Action	Completed
Ryan Corner Wind Farm	2005/2142	Not Controlled Action	Completed
Saline Recharge of meromictic Lake Fidler	2004/1334	Not Controlled Action	Completed
Spikey Beach 1, West Triton Drilling Program, Bass Basin Permit T/38P	2007/3914	Not Controlled Action	Completed
Stage 1 residential subdivision, Anna Catherine Drive	2005/1992	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Telstra optic fibre cable across Bass Strait - Sub bottom profiler Surve	2002/779	Not Controlled Action	Completed
To construct a shared trail within the Arthurs Seat Road, road reserve south side from Mornington Fl	2004/1565	Not Controlled Action	Completed
Torquay Sewerage Strategy - pipe replacement between Torquay and the Black Rock	2004/1704	Not Controlled Action	Completed
Track construction - Great Ocean Walk	2002/793	Not Controlled Action	Completed
Transfer of 90ha Point Nepean Quarantine Station from Commonwealth to Victorian	2008/4521	Not Controlled Action	Completed
Turrum Phase 2 Development Project	2008/4191	Not Controlled Action	Completed
Upgrade and Repairs to Flinders Pier	2008/4331	Not Controlled Action	Completed
Venus Bay Outfall Extension	2004/1555	Not Controlled Action	Completed
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed
Victorian Generator Project	2005/1984	Not Controlled Action	Completed
West Triton Drilling Program - Gippsland Basin	2007/3915	Not Controlled Action	Completed
West Triton Drilling Program - Otway Basin	2007/3909	Not Controlled Action	Completed
Wind Farm Construction and Operation	2001/471	Not Controlled Action	Completed
Not controlled action (particular manner)			
'Moonlight Head' 3D seismic survey, VIC/P38(V), VIC/P43 and VIC/RL8	2005/2236	Not Controlled Action (Particular Manner)	Post-Approval
2D & 3D seismic survey T/39P	2005/2237	Not Controlled Action (Particular Manner)	Post-Approval
2D Marine Seismic Survey	2005/2295	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
2D Marine Seismic Survey in Permit Areas T/32P and T/33P	2002/845	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Aquisition Survey	2008/4041	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey	2008/3962	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey	2003/1214	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey	2008/4066	Not Controlled Action (Particular Manner)	Post-Approval
2D seismic survey, Petroleum Exploration Permit Area EPP27	2006/2776	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey in VIC/P50 and VIC/P46	2004/1810	Not Controlled Action (Particular Manner)	Post-Approval
2D seismic survey VIC/P50	2005/2313	Not Controlled Action (Particular Manner)	Post-Approval
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval
3D Marine Seismic Survey within Torquay Sub-basin off sthn Victoria	2012/6256	Not Controlled Action (Particular Manner)	Post-Approval
3D seismic program VIC/P38(v), VIC/P43 and VIC/RL8	2003/1137	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Apache 3D seismic exploration survey	2006/3146	Not Controlled Action (Particular Manner)	Post-Approval
Aroo Chappell 3D seismic survey	2010/5701	Not Controlled Action (Particular Manner)	Post-Approval
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval
Bass Basin 2D and 3D seismic surveys (T/38P & T/37P)	2007/3650	Not Controlled Action (Particular Manner)	Post-Approval
Benbows Paddock residential development, Cape Bridgewater	2007/3247	Not Controlled Action (Particular Manner)	Post-Approval
Bernoulli 3D Seismic Survey	2006/3053	Not Controlled Action (Particular Manner)	Post-Approval
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval
Bitumen Storage Facility	2007/3676	Not Controlled Action (Particular Manner)	Post-Approval
Bream 3D seismic survey	2006/2556	Not Controlled Action (Particular Manner)	Post-Approval
Collection of cast bull kelp	2002/813	Not Controlled Action (Particular Manner)	Post-Approval
Construction of bridge across Barwon River	2006/2947	Not Controlled Action (Particular Manner)	Post-Approval
Construct private dwelling	2008/4234	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Construct single dwelling	2008/4504	Not Controlled Action (Particular Manner)	Post-Approval
Controlled Burn, Understorey Clearance and Removal of UXO	2003/1030	Not Controlled Action (Particular Manner)	Post-Approval
Dalrymple 3D Seismic Survey	2010/5680	Not Controlled Action (Particular Manner)	Post-Approval
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval
Enterprise Three-dimensional Transition Zone Seismic Survey, Victoria	2016/7800	Not Controlled Action (Particular Manner)	Post-Approval
Exploration drilling of the Craigow-1 and Tolpuddle-1 wells	2010/5725	Not Controlled Action (Particular Manner)	Post-Approval
Fuelbreak construction	2009/4915	Not Controlled Action (Particular Manner)	Post-Approval
Gas Pipeline	2000/20	Not Controlled Action (Particular Manner)	Post-Approval
Geelong Bypass Section 3	2005/2099	Not Controlled Action (Particular Manner)	Post-Approval
Geographe-A gas exploration well	2000/82	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Gippsland 2D Marine Seismic Survey - VIC/P-63, VIC/P-64 and T/46P	2009/5241	Not Controlled Action (Particular Manner)	Post-Approval
Golden Beach gas field development	2003/1031	Not Controlled Action (Particular Manner)	Post-Approval
Granville Wind Farm, TAS	2012/6585	Not Controlled Action (Particular Manner)	Post-Approval
Hydrocarbon exploration wells	2003/1062	Not Controlled Action (Particular Manner)	Post-Approval
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
Inspection of project vessels for presence of invasive marine pests in Commonwealth waters off Victo	2012/6362	Not Controlled Action (Particular Manner)	Post-Approval
Labatt 3D Seismic Survey T/47P Bass Strait	2007/3759	Not Controlled Action (Particular Manner)	Post-Approval
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval
Longtom-5 Offshore Production Drilling (Vic/L29), VIC	2012/6498	Not Controlled Action (Particular Manner)	Post-Approval
Longtom South -1 Exploration Drilling	2011/6217	Not Controlled Action (Particular Manner)	Post-Approval
Luxury Cruise on the Gordon River, Tasmanian Wilderness PT 2	2006/3044	Not Controlled Action (Particular Manner)	Post-Approval
Luxury Cruise on the Gordon River, Tasmanian Wilderness WHA	2004/1846	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Maintenance Dredging Program 2012-21 in Port of Melbourne	2012/6332	Not Controlled Action (Particular Manner)	Post-Approval
Marine Farming Expansion, Macquarie Harbour, TAS	2012/6406	Not Controlled Action (Particular Manner)	Post-Approval
Northern Fields 3D Seismic Survey	2001/140	Not Controlled Action (Particular Manner)	Post-Approval
Origin Energy Silvereye-1 Exploration Drilling Programme	2010/5702	Not Controlled Action (Particular Manner)	Post-Approval
OTE10 2D Marine Seismic Survey	2009/5223	Not Controlled Action (Particular Manner)	Post-Approval
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval
Pelican 3D Marine Seismic Survey, Gippsland Basin, Vic	2017/8097	Not Controlled Action (Particular Manner)	Post-Approval
Remove silt build up on existing swales around the perimeter of the Three Hummo	2010/5676	Not Controlled Action (Particular Manner)	Post-Approval
Residential Development and Associated Infrastructure at Port Fairy	2012/6687	Not Controlled Action (Particular Manner)	Post-Approval
Rockhopper-1 and Trefoil-2 Exploration Drilling in Permit Area T/18P	2009/4776	Not Controlled Action (Particular Manner)	Post-Approval
Santos 2D Seismic Survey VIC/P44 & VIC/P51	2003/1213	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval
SEA Gas Project transmission pipeline	2001/513	Not Controlled Action (Particular Manner)	Post-Approval
Seismic Survey	2001/206	Not Controlled Action (Particular Manner)	Post-Approval
Seismic Survey VIC-P46	2002/826	Not Controlled Action (Particular Manner)	Post-Approval
Shaw River Power Station construct gas pipeline and associated infrastructure	2009/5089	Not Controlled Action (Particular Manner)	Post-Approval
Shaw River Power Station Project - Water Supply Pipeline	2009/5091	Not Controlled Action (Particular Manner)	Post-Approval
Shearwater 2D and 3D marine seismic survey	2005/2180	Not Controlled Action (Particular Manner)	Post-Approval
Silvereye 3D Seismic Survey	2007/3551	Not Controlled Action (Particular Manner)	Post-Approval
Southern Flanks 2D Marine Seismic Survey	2010/5288	Not Controlled Action (Particular Manner)	Post-Approval
Southern Gas Pipeline Project	2002/619	Not Controlled Action (Particular Manner)	Post-Approval
Southern Margins T/35P and T/36P 3D Seismic Surveys	2007/3817	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Speculant 3D Transition Zone Seismic Survey	2010/5558	Not Controlled Action (Particular Manner)	Post-Approval
Strike Oil NL Seismic Surveys	2000/107	Not Controlled Action (Particular Manner)	Post-Approval
Surface Geochemical Exploration Program, TAS	2010/5780	Not Controlled Action (Particular Manner)	Post-Approval
Tap Oil Ltd Molson 2D Seismic Survey T47P	2008/3967	Not Controlled Action (Particular Manner)	Post-Approval
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, Vic	2012/6565	Not Controlled Action (Particular Manner)	Post-Approval
Thylacine-A Exploration Well	2000/81	Not Controlled Action (Particular Manner)	Post-Approval
Torquay Sub-basin (VIC/P62) OTE12-3D Seismic Survey	2012/6655	Not Controlled Action (Particular Manner)	Post-Approval
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval
Upgrade of Arthur River Road	2003/930	Not Controlled Action (Particular Manner)	Post-Approval
Vic/P37(v) and Vic/P44 3D marine seismic survey	2003/1102	Not Controlled Action (Particular Manner)	Post-Approval
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval
Vic-P51 and Vic-P52 3D seismic survey	2002/799	Not Controlled Action (Particular Manner)	Post-Approval
Wolseley 3D seismic acquisition survey	2010/5703	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
2D & 3D Seismic Surveys - Permit Area - VIC/P50	2008/4517	Referral Decision	Completed
3D Marine Seismic Survey	2011/6156	Referral Decision	Completed
3D Seismic Survey	2008/4014	Referral Decision	Completed
All actions taken in response to the current severe bushfires in Victoria.	2009/4787	Referral Decision	Completed
Alteration Reconstruction Restoration and Repairs to Buildings	2008/4179	Referral Decision	Completed
Beardie-1 Field wildcat oil well	2001/469	Referral Decision	Completed
Darymple 3D Seismic Survey, Petroleum Exploration Permit T/41P	2010/5322	Referral Decision	Completed
Kelly Channel Discharge, Macquarie Harbour, Tasmania	2017/8057	Referral Decision	Completed
Land clearing for stock grazing	2005/2176	Referral Decision	Completed
Longtom 5 Offshore Production Drilling (VIC/L29)	2012/6404	Referral Decision	Completed
Longtom-5 Offshore Production Drilling (Vic/L29)	2012/6413	Referral Decision	Completed
Portland Wave Energy Project	2008/3946	Referral Decision	Completed
Residential Development Elizabeth Avenue, Rosebud West, VIC	2015/7603	Referral Decision	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Referral decision			
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, VIC	2012/6545	Referral Decision	Completed
Upgrade of Services Infrastructure Point Nepean Quarantine Station	2008/4591	Referral Decision	Completed
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed
Wind Farm	2001/139	Referral Decision	Completed
Wolseley 3D Seismic Acquisition Survey in Permit T/32P	2010/5291	Referral Decision	Completed
Works to the buildings and surrounds at the former Point Nepean Quarantine Stati	2008/4156	Referral Decision	Completed

Key Ecological Features

[Resource Information]

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

Name	Region
Bonney Coast Upwelling	South-east
Seamounts South and east of Tasmania	South-east
Upwelling East of Eden	South-east
West Tasmania Canyons	South-east

Biologically Important Areas

Scientific Name	Behaviour	Presence
Seabirds		
Ardenna grisea Sooty Shearwater [82651]	Breeding	Known to occur
Ardenna grisea Sooty Shearwater [82651]	Foraging	Known to occur
Ardenna pacifica Wedge-tailed Shearwater [84292]	Breeding	Known to occur
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur

Scientific Name	Behaviour	Presence
Ardenna tenuirostris Short-tailed Shearwater [82652]	Breeding	Known to occur
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur
Eudyptula minor Little Penguin [1085]	Breeding	Known to occur
Eudyptula minor Little Penguin [1085]	Foraging	Known to occur
Morus serrator Australasian Gannet [1020]	Aggregation	Known to occur
Morus serrator Australasian Gannet [1020]	Foraging	Known to occur
Pelagodroma marina White-faced Storm-petrel [1016]	Breeding	Known to occur
Pelagodroma marina White-faced Storm-petrel [1016]	Foraging	Known to occur
Pelecanoides urinatrix Common Diving-petrel [1018]	Breeding	Known to occur
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur
Phalacrocorax fuscescens Black-faced Cormorant [59660]	Breeding	Known to occur
Phalacrocorax fuscescens Black-faced Cormorant [59660]	Foraging	Known to occur

Scientific Name	Behaviour	Presence
Phalacrocorax fuscescens Black-faced Cormorant [59660]	Foraging	Likely to occur
Pterodroma mollis Soft-plumaged Petrel [1036]	Breeding	Known to occur
Pterodroma mollis Soft-plumaged Petrel [1036]	Foraging	Known to occur
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur
Thalassarche cauta cauta Shy Albatross [82345]	Breeding	Known to occur
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur
Sharks		
Carcharodon carcharias White Shark [64470]	Breeding (nursery area)	Known to occur
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur

Scientific Name	Behaviour	Presence
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur
Whales		
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging (annual high use area)	Known to occur
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Known Foraging Area	Known to occur

Bioregional Assessments

SubRegion	BioRegion	Website
Gippsland	Gippsland Basin	BA website

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

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

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EPBC Act Protected Matters Report

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

Report created: 12-Jan-2024

- Summary
- Details
  - Matters of NES
  - Other Matters Protected by the EPBC Act
  - Extra Information
- Caveat
- Acknowledgements

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	1
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	85
Listed Migratory Species:	55

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	92
Whales and Other Cetaceans:	28
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	3
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	4
Regional Forest Agreements:	1
Nationally Important Wetlands:	None
EPBC Act Referrals:	62
Key Ecological Features (Marine):	1
Biologically Important Areas:	22
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

National Heritage Places		[Resource Information]
Name	State	Legal Status
Historic		
Great Ocean Road and Scenic Environs	VIC	Listed place

Commonwealth Marine Area	[Resource Information]

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

Feature Name
Commonwealth Marine Areas (EPBC Act)

Commonwealth Marine Areas (EPBC Act)

Listed Threatened Ecological Communities		[Resource Information]

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

Community Name	Threatened Category	Presence Text
Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community	Endangered	Community likely to occur within area
Giant Kelp Marine Forests of South East Australia	Endangered	Community may occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area

Listed Threatened Species		[Resource Information]

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

Scientific Name	Threatened Category	Presence Text
BIRD		
Anthochaera phrygia		
Regent Honeyeater [82338]	Critically Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat likely to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Endangered	Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat may occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thinornis cucullatus cucullatus Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Tringa nebularia		
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area
FISH		
Hoplostethus atlanticus		
Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area
Nannoperca obscura		
Yarra Pygmy Perch [26177]	Endangered	Species or species habitat may occur within area
Prototroctes maraena		
Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area
Seriolella brama		
Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area
Thunnus maccoyii		
Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area
FROG		
Litoria raniformis		
Southern Bell Frog,, Growling Grass Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area
MAMMAL		
Antechinus minimus maritimus		
Swamp Antechinus (mainland) [83086]	Vulnerable	Species or species habitat known to occur within area
Balaenoptera borealis		
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera musculus		
Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area

Scientific Name	Threatened Category	Presence Text
Balaenoptera physalus		
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area
Eubalaena australis		
Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Isoodon obesulus obesulus		
Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat known to occur within area
Mastacomys fuscus mordicus		
Broad-toothed Rat (mainland), Tooarrana [87617]	Endangered	Species or species habitat known to occur within area
Miniopterus orianae bassanii		
Southern Bent-wing Bat [87645]	Critically Endangered	Species or species habitat likely to occur within area
Neophoca cinerea		
Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area
Petaurus australis australis		
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area
Potorous tridactylus trisulcatus		
Long-nosed Potoroo (southern mainland) [86367]	Vulnerable	Species or species habitat likely to occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
PLANT		

Scientific Name	Threatened Category	Presence Text
Amphibromus fluitans River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat may occur within area
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat likely to occur within area
Haloragis exalata subsp. exalata Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat known to occur within area
Lepidium aschersonii Spiny Peppercress [10976]	Vulnerable	Species or species habitat may occur within area
Lepidium hyssopifolium Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed [16542]	Endangered	Species or species habitat may occur within area
Prasophyllum spicatum Dense Leek-orchid [55146]	Vulnerable	Species or species habitat known to occur within area
Pterostylis chlorogramma Green-striped Greenhood [56510]	Vulnerable	Species or species habitat may occur within area
Pterostylis cucullata Leafy Greenhood [15459]	Vulnerable	Species or species habitat likely to occur within area
Pterostylis tenuissima Swamp Greenhood, Dainty Swamp Orchid [13139]	Vulnerable	Species or species habitat likely to occur within area
Senecio psilocarpus Swamp Fireweed, Smooth-fruited Groundsel [64976]	Vulnerable	Species or species habitat likely to occur within area
Thelymitra epipactoides Metallic Sun-orchid [11896]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thelymitra orientalis		
Hoary Sun-orchid [88011]	Critically Endangered	Species or species habitat may occur within area
Xerochrysum palustre		
Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat likely to occur within area
REPTILE		
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Lissolepis coventryi		
Swamp Skink, Eastern Mourning Skink [84053]	Endangered	Species or species habitat known to occur within area
SHARK		
Carcharodon carcharias		
White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Centrophorus uyato		
Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area
Galeorhinus galeus		
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat likely to occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area
Ardenna tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Sternula albifrons		
Little Tern [82849]		Species or species habitat may occur within area
Thalassarche bulleri		
Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri		
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta		
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma		
Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Migratory Marine Species		
Balaenoptera bonaerensis		
Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Migratory Terrestrial Species		
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Tringa nebularia		
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat known to occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Ardenna carneipes as Puffinus carneipes		
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea as Puffinus griseus		
Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area
Ardenna tenuirostris as Puffinus tenuirostris		
Short-tailed Shearwater [82652]		Breeding known to occur within area
Bubulcus ibis as Ardea ibis		
Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata		
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni as Diomedea gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Eudyptula minor Little Penguin [1085]		Breeding known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat may occur within area overfly marine area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area overfly marine area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Phalacrocorax fuscescens Black-faced Cormorant [59660]		Breeding known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche bulleri platei as Thalassarche sp. nov.		
Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri		
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta		
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma		
Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thinornis cucullatus as Thinornis rubricollis		
Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area
Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis		
Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Tringa nebularia		
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area overfly marine area
Fish		
Heraldia nocturna		
Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus abdominalis		
Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus breviceps		
Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Hippocampus minotaur		
Bullneck Seahorse [66705]		Species or species habitat may occur within area
Histiogamphelus briggsii		
Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
Histiogamphelus cristatus		
Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Hypselognathus rostratus		
Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area
Kaupus costatus		
Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area
Kimblaeus bassensis		
Trawl Pipefish, Bass Strait Pipefish [66247]		Species or species habitat may occur within area
Leptoichthys fistularius		
Brushtail Pipefish [66248]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammal		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat likely to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area
Reptile		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area

Whales and Other Cetaceans		[Resource Information]
Current Scientific Name	Status	Type of Presence
Mammal		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Berardius arnuxii Arnoux's Beaked Whale [70]		Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area

Australian Marine Parks

[Resource Information]

Park Name	Zone & IUCN Categories
Boags	Multiple Use Zone (IUCN VI)
Zeehan	Multiple Use Zone (IUCN VI)
Zeehan	Special Purpose Zone (IUCN VI)

Extra Information

State and Territory Reserves [Resource Information]

Protected Area Name	Reserve Type	State
Bay of Islands Coastal Park	Conservation Park	VIC
Port Campbell	National Park	VIC
The Arches	Marine Sanctuary	VIC
Twelve Apostles	Marine National Park	VIC

Regional Forest Agreements [Resource Information]

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

RFA Name	State
West Victoria RFA	Victoria

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed
Controlled action			
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval
Otway Development	2002/621	Controlled Action	Post-Approval
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed
Strike Oil Gas Exploration Well, Otway Basin (VIC/P44)	2000/97	Controlled Action	Completed
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Yolla Gas Field (TRL1) Development	2001/321	Controlled Action	Post-Approval
Not controlled action			
Enterprise 1 Exploration Drilling Program, near Port Campbell, Vic	2019/8438	Not Controlled Action	Completed
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed
Exploration Drilling Well Trefoil-1	2003/1058	Not Controlled Action	Completed
Gas Field Development	2006/2635	Not Controlled Action	Completed
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
Installation of optic fibre cable from Inverloch, Victoria to Stanley, Tasmania	2002/906	Not Controlled Action	Completed
Minerva Cut Back Project, Vic	2017/8036	Not Controlled Action	Completed
Offshore exploration drilling within permit area VIC/P 37(v)	2004/1466	Not Controlled Action	Completed
Port Campbell Headland Walking Trail Realignment	2012/6676	Not Controlled Action	Completed
Track construction - Great Ocean Walk	2002/793	Not Controlled Action	Completed
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed
Victorian Generator Project	2005/1984	Not Controlled Action	Completed
Not controlled action (particular manner)			
'Moonlight Head' 3D seismic survey, VIC/P38(V), VIC/P43 and VIC/RL8	2005/2236	Not Controlled Action (Particular Manner)	Post-Approval
2D & 3D seismic survey T/39P	2005/2237	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
2D Marine Seismic Survey	2005/2295	Not Controlled Action (Particular Manner)	Post-Approval
2D Marine Seismic Survey in Permit Areas T/32P and T/33P	2002/845	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey	2008/4066	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey	2003/1214	Not Controlled Action (Particular Manner)	Post-Approval
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval
3D seismic program VIC/P38(v), VIC/P43 and VIC/RL8	2003/1137	Not Controlled Action (Particular Manner)	Post-Approval
Aroo Chappell 3D seismic survey	2010/5701	Not Controlled Action (Particular Manner)	Post-Approval
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval
Bass Basin 2D and 3D seismic surveys (T/38P & T/37P)	2007/3650	Not Controlled Action (Particular Manner)	Post-Approval
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval
Dalrymple 3D Seismic Survey	2010/5680	Not Controlled Action (Particular Manner)	Post-Approval
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval
Enterprise Three-dimensional Transition Zone Seismic Survey, Victoria	2016/7800	Not Controlled Action (Particular Manner)	Post-Approval
Exploration drilling of the Craigow-1 and Tolpuddle-1 wells	2010/5725	Not Controlled Action (Particular Manner)	Post-Approval
Geographe-A gas exploration well	2000/82	Not Controlled Action (Particular Manner)	Post-Approval
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
Labatt 3D Seismic Survey T/47P Bass Strait	2007/3759	Not Controlled Action (Particular Manner)	Post-Approval
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval
Origin Energy Silvereye-1 Exploration Drilling Programme	2010/5702	Not Controlled Action (Particular Manner)	Post-Approval
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval
Rockhopper-1 and Trefoil-2 Exploration Drilling in Permit Area T/18P	2009/4776	Not Controlled Action (Particular Manner)	Post-Approval
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval
Shearwater 2D and 3D marine seismic survey	2005/2180	Not Controlled Action (Particular Manner)	Post-Approval
Silvereye 3D Seismic Survey	2007/3551	Not Controlled Action (Particular Manner)	Post-Approval
Southern Margins T/35P and T/36P 3D Seismic Surveys	2007/3817	Not Controlled Action (Particular Manner)	Post-Approval
Strike Oil NL Seismic Surveys	2000/107	Not Controlled Action (Particular Manner)	Post-Approval
Surface Geochemical Exploration Program, TAS	2010/5780	Not Controlled Action (Particular Manner)	Post-Approval
Tap Oil Ltd Molson 2D Seismic Survey T47P	2008/3967	Not Controlled Action (Particular Manner)	Post-Approval
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, Vic	2012/6565	Not Controlled Action (Particular Manner)	Post-Approval
Thylacine-A Exploration Well	2000/81	Not Controlled Action (Particular Manner)	Post-Approval
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval
Vic/P37(v) and Vic/P44 3D marine seismic survey	2003/1102	Not Controlled Action (Particular Manner)	Post-Approval
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
Darymple 3D Seismic Survey, Petroleum Exploration Permit T/41P	2010/5322	Referral Decision	Completed
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, VIC	2012/6545	Referral Decision	Completed
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed

Key Ecological Features [Resource Information]

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

Name	Region
West Tasmania Canyons	South-east

Biologically Important Areas

Scientific Name	Behaviour	Presence
Seabirds		
Ardenna pacifica Wedge-tailed Shearwater [84292]	Breeding	Known to occur
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur
Eudyptula minor Little Penguin [1085]	Foraging	Known to occur

Scientific Name	Behaviour	Presence
Pelagodroma marina White-faced Storm-petrel [1016]	Foraging	Known to occur
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur
Sharks		
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur
Whales		
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present

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

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

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

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EPBC Act Protected Matters Report

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

Report created: 08-Feb-2024

- Summary
- Details
  - Matters of NES
  - Other Matters Protected by the EPBC Act
  - Extra Information
- Caveat
- Acknowledgements

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	46
Listed Migratory Species:	42

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	70
Whales and Other Cetaceans:	28
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	3
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	2
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	54
Key Ecological Features (Marine):	1
Biologically Important Areas:	20
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

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

Feature Name
Commonwealth Marine Areas (EPBC Act)

Commonwealth Marine Areas (EPBC Act)

Listed Threatened Ecological Communities [Resource Information]

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

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

Listed Threatened Species [Resource Information]

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

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

Scientific Name	Threatened Category	Presence Text
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche cauta		
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma		
Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thinornis cucullatus cucullatus		
Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat likely to occur within area
FISH		
Hoplostethus atlanticus		
Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area
Prototroctes maraena		
Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area
Seriolella brama		
Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Thunnus maccoyii Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area
MAMMAL		
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area
REPTILE		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
SHARK		
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

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

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

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

Scientific Name	Threatened Category	Presence Text
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Migratory Marine Species		
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eubalaena australis as Balaena glacialis australis		
Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Isurus oxyrinchus		
Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area
Lagenorhynchus obscurus		
Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lamna nasus		
Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae		
Humpback Whale [38]		Species or species habitat known to occur within area
Orcinus orca		
Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus		
Sperm Whale [59]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris canutus		
Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni as Diomedea gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche bulleri		
Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri platei as Thalassarche sp. nov.		
Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri		
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta		
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma		
Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thinornis cucullatus as Thinornis rubricollis		
Hooded Plover, Hooded Dotterel [87735]		Species or species habitat likely to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis		
Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat likely to occur within area overfly marine area
Fish		
Heraldia nocturna		
Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus abdominalis		
Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus breviceps		
Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Hippocampus minotaur		
Bullneck Seahorse [66705]		Species or species habitat may occur within area
Histiogamphelus briggsii		
Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
Histiogamphelus cristatus		
Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Hypselognathus rostratus		
Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area
Kaupus costatus		
Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area
Kimblaeus bassensis		
Trawl Pipefish, Bass Strait Pipefish [66247]		Species or species habitat may occur within area
Leptoichthys fistularius		
Brushtail Pipefish [66248]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammal		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat likely to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area
Reptile		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area

Whales and Other Cetaceans		[Resource Information]
Current Scientific Name	Status	Type of Presence
Mammal		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Berardius arnuxii Arnoux's Beaked Whale [70]		Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area

Australian Marine Parks

[Resource Information]

Park Name	Zone & IUCN Categories
Boags	Multiple Use Zone (IUCN VI)
Zeehan	Multiple Use Zone (IUCN VI)
Zeehan	Special Purpose Zone (IUCN VI)

Extra Information

State and Territory Reserves		[Resource Information]
Protected Area Name	Reserve Type	State
The Arches	Marine Sanctuary	VIC
Twelve Apostles	Marine National Park	VIC

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Otway Astrolabe 3D Marine Seismic Survey, Otway Basin	2012/6421		Completed
Controlled action			
Casino Gas Field Development	2003/1295	Controlled Action	Post-Approval
Otway Development	2002/621	Controlled Action	Post-Approval
Schomberg 3D Marine Seismic Survey	2007/3754	Controlled Action	Completed
Strike Oil Gas Exploration Well, Otway Basin (VIC/P44)	2000/97	Controlled Action	Completed
VICP61 2D Marine Seismic Survey	2008/4075	Controlled Action	Completed
Yolla Gas Field (TRL1) Development	2001/321	Controlled Action	Post-Approval
Not controlled action			
Enterprise 1 Exploration Drilling Program, near Port Campbell, Vic	2019/8438	Not Controlled Action	Completed
Exploration drilling for liquid/gaseous hydrocarbons	2004/1681	Not Controlled Action	Completed
Exploration Drilling Well Trefoil-1	2003/1058	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Gas Field Development	2006/2635	Not Controlled Action	Completed
Henry-1 Exploration Well, Petroleum Permit Area VIC/P44	2005/2147	Not Controlled Action	Completed
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
Installation of optic fibre cable from Inverloch, Victoria to Stanley, Tasmania	2002/906	Not Controlled Action	Completed
Offshore exploration drilling within permit area VIC/P 37(v)	2004/1466	Not Controlled Action	Completed
VIC-P44 Stage 2 Gas Field Development	2007/3767	Not Controlled Action	Completed
Victorian Generator Project	2005/1984	Not Controlled Action	Completed
Not controlled action (particular manner)			
'Moonlight Head' 3D seismic survey, VIC/P38(V), VIC/P43 and VIC/RL8	2005/2236	Not Controlled Action (Particular Manner)	Post-Approval
2D & 3D seismic survey T/39P	2005/2237	Not Controlled Action (Particular Manner)	Post-Approval
2D Marine Seismic Survey	2005/2295	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey	2003/1214	Not Controlled Action (Particular Manner)	Post-Approval
3D marine seismic survey near King Island	2004/1461	Not Controlled Action (Particular Manner)	Post-Approval
3D seismic program VIC/P38(v), VIC/P43 and VIC/RL8	2003/1137	Not Controlled Action (Particular Manner)	Post-Approval
Aroo Chappell 3D seismic survey	2010/5701	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Astrolabe 3D Marine Seismic Survey	2011/6048	Not Controlled Action (Particular Manner)	Post-Approval
Bass Basin 2D and 3D seismic surveys (T/38P & T/37P)	2007/3650	Not Controlled Action (Particular Manner)	Post-Approval
BHPBilliton Otway 3D Seismic Survey	2007/3443	Not Controlled Action (Particular Manner)	Post-Approval
Deepwater Sorell Basin 2001 Non-Exclusive 2D Seismic Survey	2001/156	Not Controlled Action (Particular Manner)	Post-Approval
Drill and Profile Exploration Well Somerset 1, License Area T34P	2009/5037	Not Controlled Action (Particular Manner)	Post-Approval
Enterprise Three-dimensional Transition Zone Seismic Survey, Victoria	2016/7800	Not Controlled Action (Particular Manner)	Post-Approval
Exploration drilling of the Craigow-1 and Tolpuddle-1 wells	2010/5725	Not Controlled Action (Particular Manner)	Post-Approval
Geographe-A gas exploration well	2000/82	Not Controlled Action (Particular Manner)	Post-Approval
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
Labatt 3D Seismic Survey T/47P Bass Strait	2007/3759	Not Controlled Action (Particular Manner)	Post-Approval
La Bella 3D Marine Seismic Survey, Otway Basin, VIC	2012/6683	Not Controlled Action (Particular Manner)	Post-Approval
Origin Energy Silvereye-1 Exploration Drilling Programme	2010/5702	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Otway Basin Exploration Drilling Campaign, Vic	2011/6125	Not Controlled Action (Particular Manner)	Post-Approval
Rockhopper-1 and Trefoil-2 Exploration Drilling in Permit Area T/18P	2009/4776	Not Controlled Action (Particular Manner)	Post-Approval
Santos Otway 3d Seismic VIC/P44	2007/3367	Not Controlled Action (Particular Manner)	Post-Approval
Schomberg 3D Marine Seismic survey	2007/3868	Not Controlled Action (Particular Manner)	Post-Approval
Shearwater 2D and 3D marine seismic survey	2005/2180	Not Controlled Action (Particular Manner)	Post-Approval
Silvereye 3D Seismic Survey	2007/3551	Not Controlled Action (Particular Manner)	Post-Approval
Southern Margins T/35P and T/36P 3D Seismic Surveys	2007/3817	Not Controlled Action (Particular Manner)	Post-Approval
Strike Oil NL Seismic Surveys	2000/107	Not Controlled Action (Particular Manner)	Post-Approval
Surface Geochemical Exploration Program, TAS	2010/5780	Not Controlled Action (Particular Manner)	Post-Approval
Tap Oil Ltd Molson 2D Seismic Survey T47P	2008/3967	Not Controlled Action (Particular Manner)	Post-Approval
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, Vic	2012/6565	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Thylacine-A Exploration Well	2000/81	Not Controlled Action (Particular Manner)	Post-Approval
Undertake a three dimensional marine seismic survey	2010/5700	Not Controlled Action (Particular Manner)	Post-Approval
Vic/P37(v) and Vic/P44 3D marine seismic survey	2003/1102	Not Controlled Action (Particular Manner)	Post-Approval
VIC P44 Gas Exploration Wells	2002/662	Not Controlled Action (Particular Manner)	Post-Approval
Vic-P51 and Vic-P52 2D seismic survey	2002/811	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
The Enterprise 3D Seismic Acquisition Survey, Otway Basin, VIC	2012/6545	Referral Decision	Completed
VICP61 2D Marine Seismic Survey	2008/3975	Referral Decision	Completed

Key Ecological Features [Resource Information]

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

Name	Region
West Tasmania Canyons	South-east

Biologically Important Areas

Scientific Name	Behaviour	Presence
Seabirds		
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur

Scientific Name	Behaviour	Presence
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur
Pelagodroma marina White-faced Storm-petrel [1016]	Foraging	Known to occur
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur
Sharks		
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur
Whales		
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur

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

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

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

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E. 2. Planning Area

E. 3. Light EMBA

E. 4. Sound EMBA

Appendix F Drilling Program GHG Forecast

Beach Energy Limited

Beach Offshore Gas Victoria Drilling Program

Greenhouse Gas Emissions Technical Summary

ASSIGNMENT P100331-S00
DOCUMENT P-100331-S00-A-REPT-001

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REVISIONS & APPROVALS

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REV	DATE	DESCRIPTION	ISSUED	CHECKED	APPROVED	CLIENT
R02	01/02/2024	Issued for Review	FC	MH, SJ	SJ	Beach
R01	22/12/2023	Issued for Review	FC	MH	SJ, RH	Beach

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APPENDIX 8

GREENHOUSE GAS EMISSIONS TECHNICAL SUMMARY

Beach Energy (Operations) Limited (Beach) proposes to undertake a Drilling Program within Commonwealth waters of the Otway and Bass Basins. The Drilling Program will be undertaken within the period of 1 November 2024 to the 31 December 2028. To support the Environment Plan (EP), this technical summary presents the worst-case greenhouse gas (GHG) emissions estimate for the Drilling Program for the activities outlined in Section 3 of the EP.

The boundary of assessment (Table 1) covers the direct and indirect GHG emissions associated with the Drilling Program, defined as below:

- Direct emissions: GHG emissions directly emitted within the Drilling Program from sources owned or controlled by Beach. As there is no planned cold venting of hydrocarbons to atmosphere, and emissions from waste generation and fugitive emissions are assumed to be immaterial, flaring is the only emissions source for direct emissions which may only occur at Yolla-7 during well testing.
- Indirect emissions: GHG emissions from sources not owned or operated by Beach. Indirect emissions include the following emissions sources – vessels (operated within the operational areas), mobile offshore drilling unit (MODU), helicopter, embodied carbon from materials used, and employee commuting (immaterial). For the embodied carbon, only the following major items have been considered – cement, casing/conductor, and water-based drilling fluid (WBDF).

Table 1: Boundary of assessment

INFORMATION \ ACTIVITY	EXPLORATION AND APPRAISAL WELL DRILLING ACTIVITY		YOLLA-7 ACTIVITIES	ABANDONMENT OF LEGACY SUSPENDED WELLS
	OTWAY	BASS		
Licence:	VIC/P73 and/or VIC/P43, T/30P	T/RL2, T/RL4 and/or T/RL5	T/L1	T/L1, T/L2, T/RL2, T/RL4, VIC/L23
Maximum No. of Wells (inc. contingency):	6	4	1	5
Emissions Sources				
Direct Emissions:	Inclusion(s): - Exclusion(s): • Waste generated[1] • Fugitives[1]	Inclusion(s): - Exclusion(s): • Waste generated[1] • Fugitives[1]	Inclusion(s): • Flaring Exclusion(s): • Waste generated[1] • Fugitives[1]	Inclusion(s): - Exclusion(s): • Waste generated[1] • Fugitives[1]
Indirect Emissions:	Inclusion(s): • Vessels (inc. ROV[2]) • MODU • Helicopter • Materials[3] Exclusion(s): • Employee commuting[1]	Inclusion(s): • Vessels (inc. ROV[2]) • MODU • Helicopter • Materials[3] Exclusion(s): • Employee commuting[1]	Inclusion(s): • Vessels (inc. ROV[2]) • MODU • Helicopter • Materials[3] Exclusion(s): • Employee commuting[1]	Inclusion(s): • Vessels (inc. ROV[2]) • MODU • Helicopter • Materials[3] Exclusion(s): • Employee commuting[1]

[1] Assumed immaterial.
[2] No additional emissions from remotely operating vehicles (ROV) as they are powered by the vessels.
[3] Materials refer to only the major items – cement, casing, and water-based drilling fluid (WBDF).

The GHG emissions were calculated using the National Greenhouse and Energy Reporting (Measurement) Determination 2008 methodology made in accordance with the *National Greenhouse and Energy Reporting Act 2007* (NGER Act) (DCCEEW 2022). Estimates for fuel usage of vessels and MODU were extracted from Xodus' database and emissions factors for the materials were taken from the Inventory of Carbon and Energy (ICE) Database. Further information and assumptions are provided in the Appendix.

As shown in Table 2 and Figure 1, the total worst-case GHG emissions are estimated to be approximately **150 kt CO_2-e** over the Drilling Program, consisting of 92% indirect emissions (138 kt CO_2-e) and 8% direct emissions (12 kt CO_2-e). The worst-case conditions have taken the longest possible durations of the activities and maximum flaring duration and rate at Yolla 7. The GHG emissions estimates for Exploration and Appraisal Well Drilling Activity, Yolla 7 Activities, and Abandonment of Legacy Suspended Wells are approximately 105, 21, and 24 kt CO_2-e, respectively.

The GHG emissions from vessels, MODU, flaring, helicopters, and materials represent 52%, 31%, 8%, 1%, and 8% of the total emissions, respectively. The total GHG emissions estimate for the Drilling Program is less than approximately 0.01% and 0.05% of the Australian[1] and Victorian[2] carbon budgets, respectively, for the duration of the Drilling Program (1 November 2024 - 31 December 2028).

Table 2: GHG Emissions Estimate for the Drilling Program

GHG EMISSIONS BREAKDOWN	WORST-CASE GHG EMISSIONS ESTIMATE	
Total GHG emissions (t CO_2-e)	**150,000 t CO_2-e**	
Direct Emissions	**12,000 t CO_2-e**	**8%**
Flaring	12,000 t CO_2-e	8%
Indirect Emissions	**138,000 t CO_2-e**	**92%**
Vessels	79,000 t CO_2-e	52%
MODU	46,000 t CO_2-e	31%
Materials	12,000 t CO_2-e	8%
Helicopter	1,000 t CO_2-e	1%
GHG Emissions Breakdown by Activity		
Exploration and Appraisal Well Drilling Activity	**105,000 t CO_2-e**	**70%**
Yolla-7 Activities	**21,000 t CO_2-e**	**14%**
Abandonment of Legacy Suspended Wells	**24,000 t CO_2-e**	**16%**

[1] *In June 2022, Australia committed to reduce GHG emissions to 43% below 2005 levels by 2030 and reaffirmed its target to achieve net zero emissions by 2050 (DCCEEW, 2022). Based on forecasting, the Commonwealth Government has forecasted the annual carbon budget including a scenario called 'with additional measures' that includes policies and measures in place at the time of publication. The Australian carbon budget (for the duration of the Drilling Project) was determined by summing the annual projected emissions of the 'with additional measures' scenario from November 2024 to December 2028.*

[2] *In May 2023, Victoria State Government formalised emissions reduction target under Victorian* Climate Change Act 2017, *committing to reduce Victoria's emissions from 2005 levels and bring forward the date to achieve net-zero emissions from 2050 to 2045 (Victoria State Government, 2023). The Victorian carbon budget (for the duration of the Drilling Program) was determined by extrapolating the emissions targets set by the Victoria State Government using the upper bound of the targets (e.g.., 33% by 2025, 50% by 2030) against the 2005 baseline.*

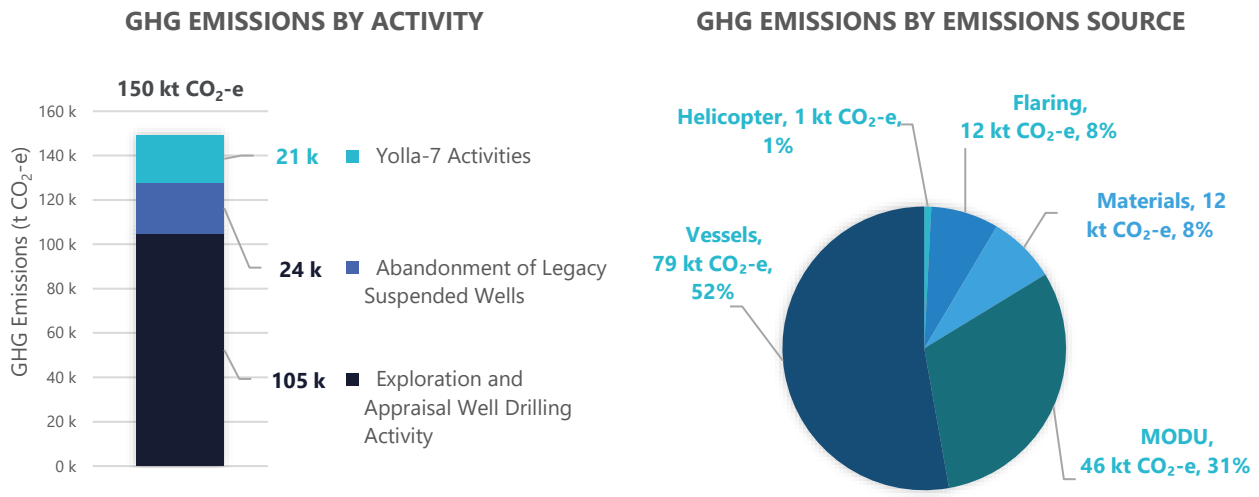

Figure 1: GHG Emissions for the Drilling Program by activity and emissions source under worst-case conditions

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DCCEEW 2022. National Greenhouse and Energy Reporting (Measurement) Determination 2008, NGER Act 10(3), Commonwealth of Australia, Department of Climate Change, Energy, the Environment and Water, Canberra.

DCCEEW, 2022. Australia's emissions projections 2022, Department of Climate Change, Energy, the Environment and Water. URL: https://www.dcceew.gov.au/climate-change/publications/australias-emissions-projections-2022#:~:text=The%20revised%202030%20commitment%20is%20both%20a%20single-year,budget%20for%20this%20period%20is%204%2C381%20Mt%20CO%E2%82%82-e (accessed on 23 January 2024).

Victoria State Government, 2023. Victoria's 2035 emissions reduction target. URL: https://www.climatechange.vic.gov.au/__data/assets/pdf_file/0028/635590/Victorias-2035-Climate-Target_Driving-Real-Climate-Action.pdf (accessed on 23 January 2024).

APPENDIX

List of information and assumptions used:

General

1. Drilling, Well Testing and Completions, and Plug and Abandonment taken as 40, 20, and 20 days per well, respectively (worst-case).
2. Drilling, Well Testing and Completion, and Plug and Abandonment of wells occur in one campaign.

Flaring and venting

3. Flaring will occur only at Yolla-7 during well testing, at 80 MMscfd/well for a maximum of 48 hours. No flaring during P&A or drilling.
4. No planned cold venting of hydrocarbons to atmosphere.

Vessels, MODU, and helicopters

5. All activities occur one well at a time (one MODU).
6. Vessel activities outside the operational areas are excluded.
7. Drilling, Well Testing and Completion, and Plug and Abandonment will involve 3 x anchor handling tug supply vessels (AHTS).
8. Daily resupply operations with one supply vessel.
9. No fuel bunkering at sea for vessels.
10. One helicopter used throughout the campaigns, with a maximum of 7 flights per week.

Other

11. Major items required for well drilling assumed to be 445.6 t of cement per well, 183 m^3 of water-based drilling fluid (WBDF) per well, and 367 t of corrosion resistant alloys (CRA casing) for the Drilling program.
12. Major items required for P&A assumed to be 445.6 t of cement per well and 250 m^3 of WBDF per well.
13. Immaterial emissions from waste generated and employee commuting.

Appendix G Acoustic Modelling Reports

G. 1. Trefoil Drilling Underwater Sound Modelling Addendum (Stroot et al. 2022)

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Technical Memo

DATE: 25 August 2022

DOCUMENT: 02751

FROM: Dion Stroot, Matthew Koessler, Craig McPherson (JASCO Applied Sciences (Australia) Pty Ltd)

TO: Phil Wemyss (Beach Energy)

Subject: Trefoil drilling underwater sound modelling addendum

1. Summary

This memo presents underwater sound modelling for drilling in the Trefoil gas field, located in central Bass Strait. These results supplement modelling previously presented in Stroot et al. (2022) for drilling at the Yolla platform, located 38 km to the east of Trefoil. Seabed and water column conditions in central Bass Strait are generally similar, so the Yolla model and its parameterisation was used because of it is representative of other central Bass Strait locations, including the Trefoil gas field.

Estimated underwater acoustic levels are presented as sound pressure levels (SPL, L_p), and as accumulated sound exposure levels (SEL, L_E) as appropriate for non-impulsive (continuous) noise sources. For the non-time dependent scenarios, the modelled maximum and 95th percentile distances to the marine mammal behavioural threshold based on the current interim NOAA (2019) criterion for marine mammals of 120 dB re 1 µPa (SPL; L_p) for non-impulsive sound sources are summarised in Table 1. The modelled SPL of scenarios two and three are equivalent and only the results for scenario two are displayed in Table 1.

For the time-dependent scenarios, the modelled maximum distances to permanent threshold shift (PTS) and temporary threshold shift (TTS) criteria for low-frequency cetaceans Southall et al. (2019), which are based on SEL accumulated over a period of time, are summarised in Table 2.

Table 1. Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) to sound pressure level (SPL) from the most appropriate location for considered sources for scenarios 1 and 2. MCR: Maximum Continuous Rating, MODU: Mobile Offshore Drilling Unit, OSV: Offshore Supply Vessel

Applicable Scenario numbers	Description	R_{max} (km)	$R_{95\%}$ (km)
1	MODU Drilling	2.12	2.01
2, 3	MODU Drilling with OSV under DP	6.23	5.87

Table 2. Summary: Maximum (R_{max}) horizontal distances (in km) and ensonified area (km^2) for the frequency-weighted LF-cetacean SEL_{24h} TTS thresholds based on Southall et al. (2019) from the most appropriate location for considered sources per scenario. MODU: Mobile Offshore Drilling Unit, OSV: Offshore Supply Vessel.

Scenario number	Description	R_{max} (km)	Area (km^2)
1	MODU Drilling	0.33	0.31
2	MODU OSV under DP (4h)	0.60	0.89
3	MODU OSV under DP (8h)	0.82	1.80

2. Scenario Details

The scenarios considered within this assessment are detailed below and in Table 4, with the associated modelling sites provided in Table 3. An overview of the scenarios is as follows:

1. Mobile Offshore Drilling Unit (MODU) conducting normal drilling operations
2. MODU with Offshore Supply Vessel (OSV) conducting resupply operations under Dynamic Positioning (DP) for 4 and 8 h during a 24 h period. The OSV is positioned 68 m east of the MODU.

Table 3. Location details for the modelled sites. MODU: Mobile Offshore Drilling Unit, OSV: Offshore Supply Vessel, DP: Dynamic Positioning.

Site	Source	Latitude (S)	Longitude (E)	MGA Zone 55		Water depth (m)
				X (m)	*Y* (m)	
1	Anchored MODU	39° 50’ 40.65”	145° 49’ 4.98”	398880	5588819	80.0
2	OSV	39° 50’ 40.68”	145° 49’ 7.85”	398948	5588819	80.0

Table 4. Description of modelled scenarios. MODU: Mobile Offshore Drilling Unit, OSV: Offshore Supply Vessel, DP: Dynamic Positioning.

Scenario number	Sites(s)	Description	SSP Month
1	1	MODU Drilling	August
2	1,2	MODU Drilling with OSV under DP (resupply 4 h)	August
3	1,2	MODU Drilling with OSV under DP (resupply 8 h)	August

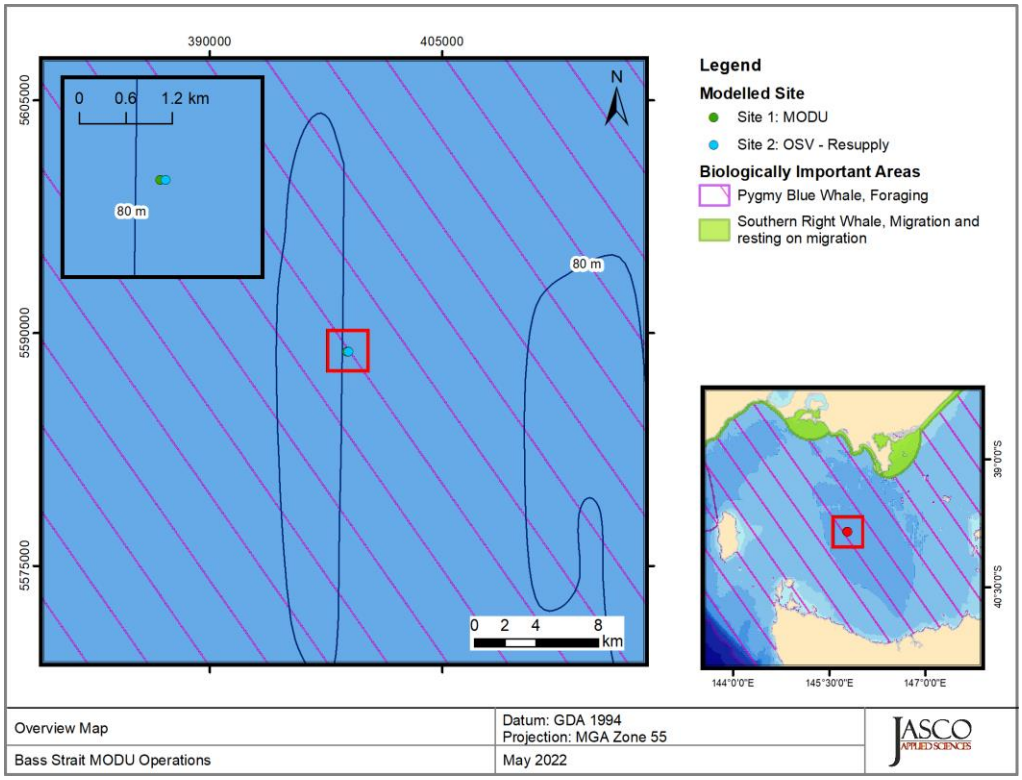

Figure 1. Overview of the modelled area and local features within the area of the Trefoil gas field.

3. Methods and Parameters

A detailed description of the employed modelling method and input parameters can be found in Stroot et al. (2022). A brief summary of key elements used in this addendum are provided in this section.

Figure 2 presents the source spectra for the MODU and OSV. The MODU spectrum was derived from measurements taken during the *Ocean Onyx* drilling campaign in the Otway Basin (McPherson et al. 2021). For the OSV under dynamic positioning (DP) an appropriate spectrum was synthesised based on knowledge of vessel and thruster configurations used in similar studies. The method of calculation are presented in Stroot et al. (2022).

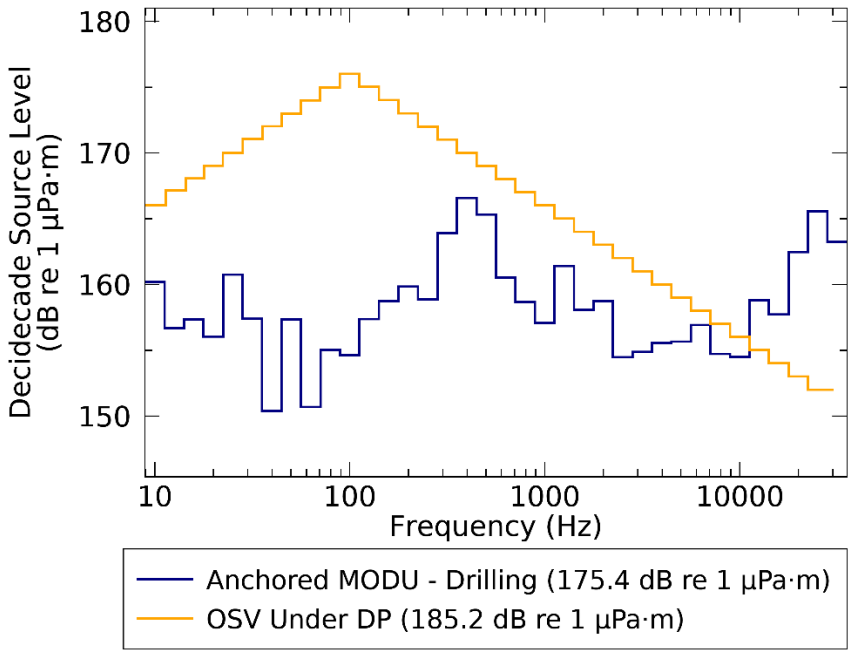

Figure 2. Energy source level (ESL) spectra (in decidecade frequency-band) for both sound sources (from in Stroot et al. (2022)).

4. Results

Maximum-over-depth sound fields are presented below in two formats: as tables of distances to sound levels and, where the distances are long enough, as contour maps showing the directivity and distance to various sound levels. Reported distances to isopleths/thresholds were the taken from most dominant source. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

Table 5 presents the maximum and 95% distances (defined in Appendix B4 of Stroot et al. (2022)) to SPL isopleths. Since the SPL metric does not depend on the duration of the operation, these estimates are valid for both, stationary and non-stationary scenarios. Table 6 presents the distances to frequency-weighted SEL_{24h} threshold, as well as the total ensonified area for all scenarios.

4.1. Tabulated Results

Table 5. *Scenarios 1 and 2:* Scenarios 2 and 3 have identical SPL modelling parameters. Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) to sound pressure level (SPL) from the most appropriate location for considered sources per scenario.

SPL (L_p; dB re 1 µPa)	Scenario 1 MODU Drilling		Scenario 2 MODU Drilling with OSV under DP	
	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)
180	–	–	0.01	0.01
170[A]	0.00	0.00	0.07	0.07
160	0.02	0.02	0.09	0.09
158[B]	0.02	0.02	0.09	0.09
150	0.02	0.02	0.09	0.09
140	0.07	0.07	0.50	0.47
130	0.39	0.38	2.08	1.93
120[C]	2.12	2.01	6.23	5.87
110	9.46	8.93	18.9	18.1

[A] 48 h threshold for recoverable injury for fish with a swim bladder involved in hearing (Popper et al. 2014).
[B] 12 h threshold for TTS for fish with a swim bladder involved in hearing (Popper et al. 2014).
[C] Threshold for marine mammal behavioural response to continuous noise (NOAA 2019).
A dash (-) indicates the level was not reached within the limits of the modelling resolution (20 m).
MODU - Mobile Offshore Drilling Unit
OSV - Offshore Supply Vessel
DP - Dynamic Positioning.

Table 6. Maximum (R_{max}) horizontal distances (in km) to frequency-weighted SEL_{24h} PTS and TTS thresholds based on Southall et al. (2019) and Finneran et al. (2017) from the most appropriate location for considered sources per scenario, and ensonified area (km^2).

Hearing group	Frequency-weighted SEL_{24h} threshold ($L_{E,24h}$; dB re 1 µPa²·s)	Scenario 1 MODU Drilling		Scenario 2 MODU Drilling with OSV under DP (4 hr)		Scenario 3 MODU Drilling with OSV under DP (8 hr)	
		R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)
PTS							
Low-Frequency (LF) cetaceans	199	0.02	/	0.09	/	0.08	0.01
High-frequency (HF) cetaceans	198	0.02	/	0.09	/	0.08	/
Very High-frequency (VHF) cetaceans	173	0.09	0.03	0.15	0.03	0.11	0.03
Otariid seals	219	–	/	–	/	–	/
Turtles	220	–	/	0.01	/	0.08	/
TTS							
Low-Frequency (LF) cetaceans	179	0.33	0.31	0.60	0.89	0.82	1.80
High-frequency (HF) cetaceans	178	0.06	0.01	0.13	0.02	0.10	0.02
Very High-frequency (VHF) cetaceans	153	1.30	5.01	1.40	5.54	1.37	5.73
Otariid seals	199	0.02	/	0.09	/	0.08	/
Turtles	200	0.02	/	0.09	/	0.10	/

A dash (-) indicates the level was not reached within the limits of the modelling resolution (20 m).
A slash (/) indicates that the area is less than an area associated with the modelled resolution (0.0013 km^2).
MODU - Mobile Offshore Drilling Unit
OSV - Offshore Supply Vessel
DP - Dynamic Positioning.

4.2. Sound Field Maps

4.2.1. SPL Maps

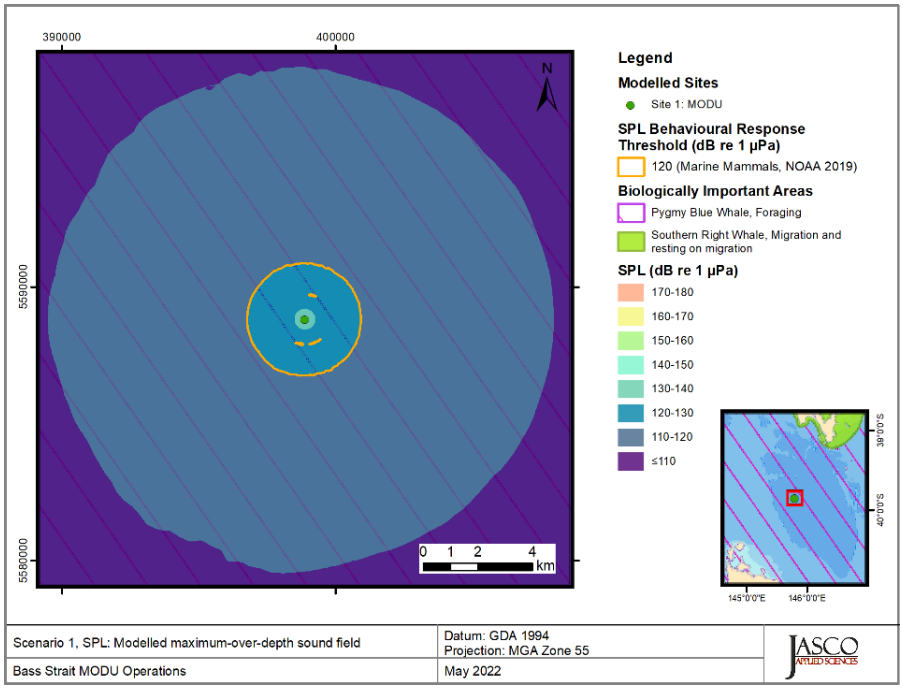

Figure 3. *MODU Drilling (Scenario 1) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

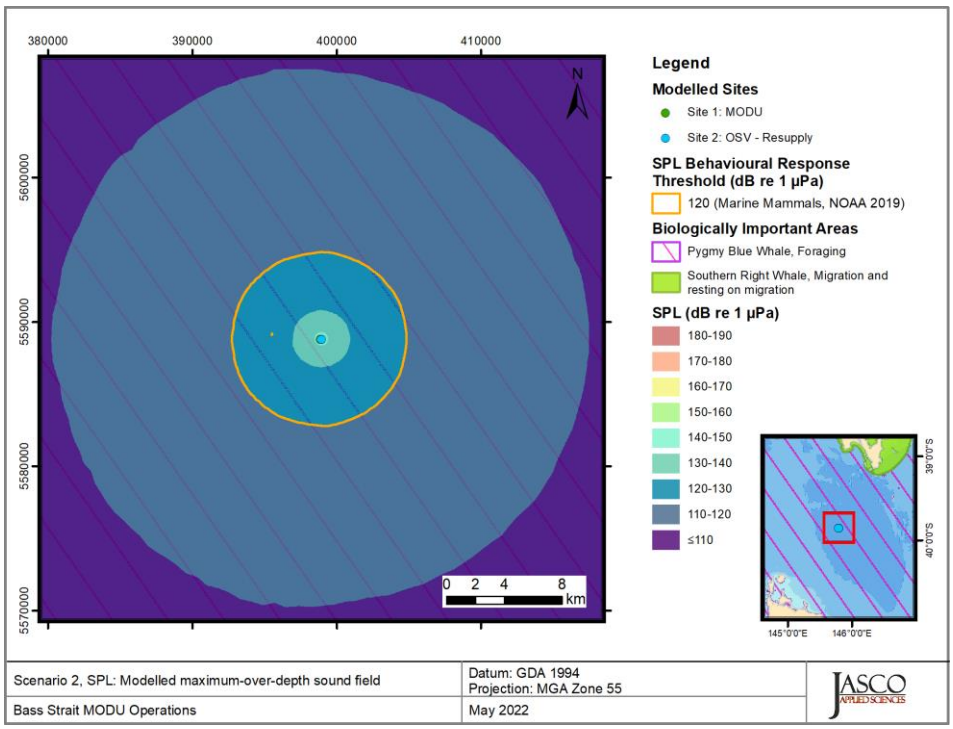

Figure 4. *MODU Drilling with OSV on DP (Scenarios 2 and 3) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

4.2.2. Accumulated SEL_{24h} Maps

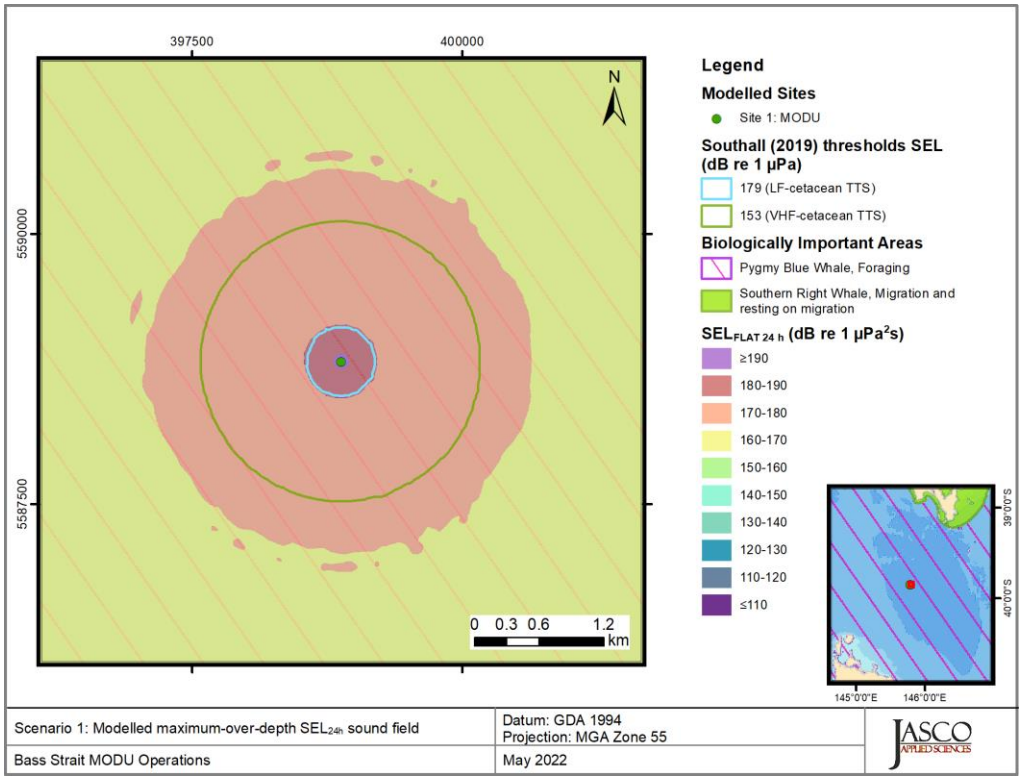

Figure 5. *MODU Drilling (Scenario 1) SEL_{24h}*: Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds.

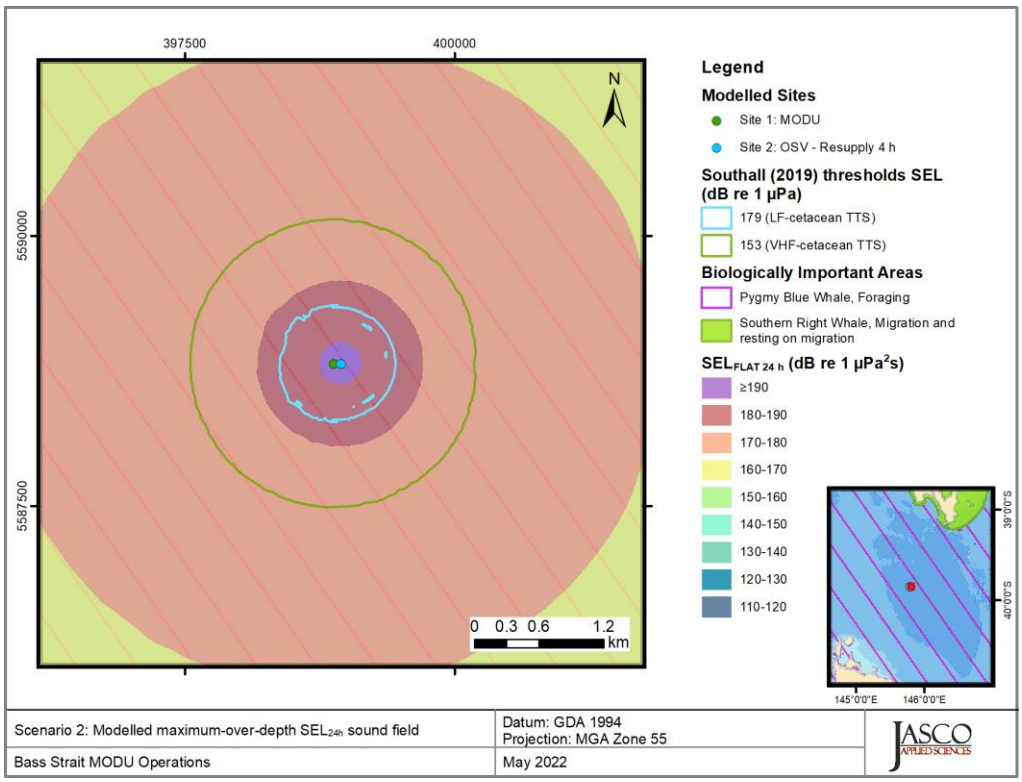

Figure 6. *MODU Drilling with OSV on DP (4h) (Scenario 2) SEL_{24h}*: Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds.

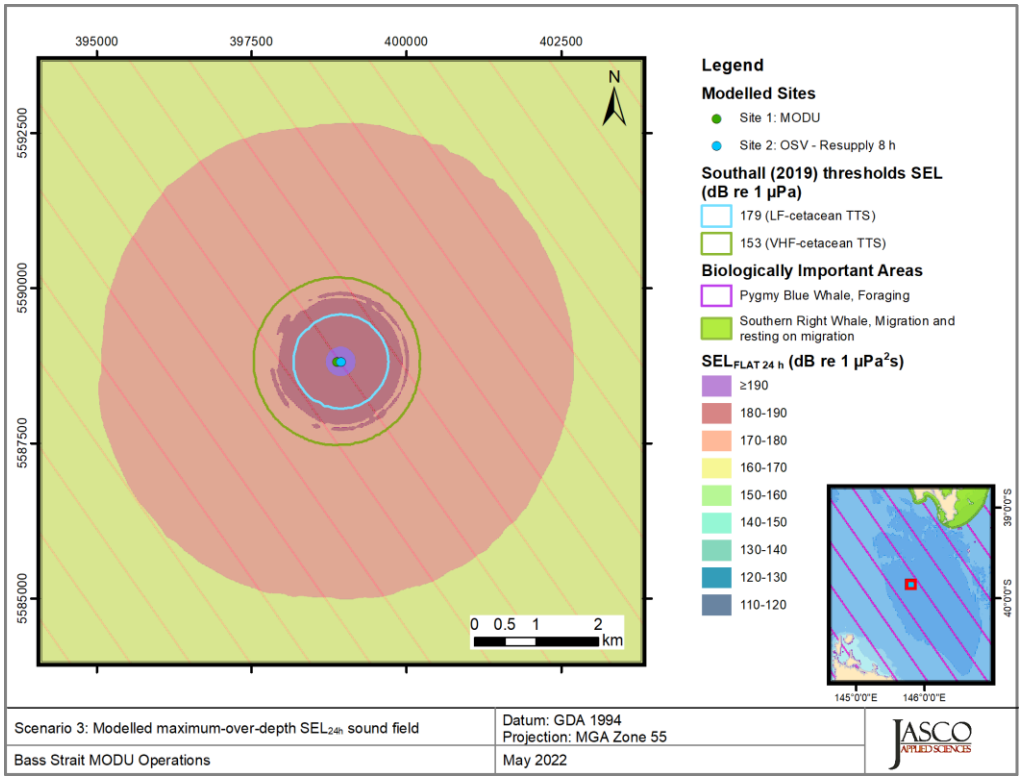

Figure 7. *MODU Drilling with OSV on DP (8h) (Scenario 3) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds.

4.3. Discussion

The Yolla and Trefoil gas fields are located in the central Bass Strait region. The slow changing bathymetry of this region manifests itself in the generally symmetric sound field footprints observed in Figures 3–7. The geological environment is also consistent. This consistent environment supports the validity of applying the environmental parameters used for the Yolla platform 38 km east of the Trefoil field. This modelling study therefore inherits the highly reflective sea-bed observed at the Yolla site (Stroot et al. 2022), which increases the propagation distances in all scenarios.

For the results tables presented in Section 4.1, thresholds are not reached for many scenarios. Due to the discretely sampled 20 m calculation grids of the modelled sound fields, distances to these thresholds could not be estimated for practicable computational purposes. It is likely that SPL isopleths could be reached at distances between the source and the modelled horizontal resolution (20 m); however, distances to injurious accumulated SEL thresholds may not be reached at any range greater than the point source representation of the MODU and OSV, due to the species-specific frequency weighing functions. Additionally, if close-to-source radii are comparable to the dimensions of the modelled source then they may only be reached within proximity to the source, if at all.

References

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G.2 Beach Otway Project Additional and Revised Modelling Study (Koessler and McPherson 2021)

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TECHNICAL ADDENDUM

DATE: 27 August 2021

FROM: Matthew Koessler, Craig McPherson (JASCO Applied Sciences (Australia) Pty Ltd)

TO: Phil Wemyss (Beach Energy)

SUBJECT: Beach Otway Project: Additional and Revised Modelling Study

1. Summary

JASCO Applied Sciences (JASCO) performed modelling study of underwater sound levels associated with the Beach Energy Otway Development, to supplement drilling and construction results previously presented in Koessler et al. (2020), Matthews et al. (2020) and Matthews et al. (2021).

The results have been revised due to better understanding of the propagation loss in the region gained through the validation monitoring of drilling operations at Artisan-1 McPherson et al. (2021). A significant finding of this study was lack of a thin layer of sand overlying the carbonate seabed structure near Artisan-1, which has a significant influence on propagation loss.

This monitoring project also characterised Monopole Source Levels (MSL) for project vessels (during transit and under dynamic positioning (DP)) and the *Ocean Onyx* Mobile Offshore Drilling Unit (MODU). These source levels are considered in the revised modelling.

Estimated underwater acoustic levels are presented as sound pressure levels (SPL, L_p), and as accumulated sound exposure levels (SEL, L_E) as appropriate for non-impulsive (continuous) noise sources. For the non-time dependent scenarios, the modelled maximum and 95th percentile distances to the marine mammal behavioural threshold based on the current interim NOAA (2019) criterion for marine mammals of 120 dB re 1 µPa (SPL; L_p) for non-impulsive sound sources are summarised in Table 1.

For the time-dependent scenarios, the modelled maximum distances to permanent threshold shift (PTS) and temporary threshold shift (TTS) criteria for low-frequency cetaceans (NMFS 2018), which are based on SEL accumulated over a period of time are summarised in Table 2.

Table 1. Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) to sound pressure level (SPL) from the most appropriate location for considered sources per scenario. MCR: Maximum Continuous Rating, MODU: Mobile Offshore Drilling Unit, OSV: Offshore Supply Vessel, ROV: Remotely Operated Vehicle.

Applicable Scenario number	Well Area	Description	R_{max} (km)	$R_{95\%}$ (km)
A1	Thylacine North-1	MODU Drilling	1.24	1.12
A2		OSV under DP	7.1	6.5
A3		OSV Standby Transit	0.38	0.35
A4	Thylacine A	Platform Operations	0.20	0.19
A5	Thylacine North-1	MODU Drilling + OSV resupply	7.89	6.56
A7		MODU Drilling + OSV Standby Transit	1.32	1.19
1, 2, 3, 4	Thylacine A	Platform Operations + OSV resupply	7.28	6.56
5, 6		Platform Operations + OSV Standby	0.45	0.43
7, 9	Thylacine North-1	Pipelay Vessel stationary (June), operating at 20% MCR	2.71	2.57
8, 10		Pipelay Vessel stationary (November), operating at 20% MCR	2.70	2.55
11, 13	Artisan-1	Pipelay Vessel stationary (June), operating at 20% MCR	2.27	2.09
12, 14		Pipelay Vessel stationary (November), operating at 20% MCR	2.26	2.02
15	Thylacine North-1 + Geographe-4	Vessel stationary, operating at 20% MCR (Thylacine North-1) + Vessel stationary, operating at 20% MCR + ROV cutting tool (Geographe-4) (June)	2.98	2.76
16		Vessel stationary, operating at 20% MCR (Thylacine North-1) + Vessel stationary, operating at 20% MCR + ROV cutting tool (Geographe-4) (November)	2.97	2.73
17	Artisan-1 + Geographe-4	Vessel stationary, operating at 20% MCR (Artsian-1) + Vessel stationary, operating at 20% MCR + ROV cutting tool (Geographe-4) (June)	2.98	2.75
18		Vessel stationary, operating at 20% MCR (Artsian-1) + Vessel stationary, operating at 20% MCR + ROV cutting tool (Geographe-4) (November)	2.97	2.72

Applicable Scenario number	Well Area	Description	R_{max} (km)	$R_{95\%}$ (km)
19, 20	Thylacine North-1 + Thylacine A	MODU Drilling + Platform + OSV resupply	7.90	6.65
21		MODU Drilling + Platform + Skid installation vessel operating at 20% MCR	4.85	4.29
23	Thylacine North-1	Pipelay Vessel stationary (June), operating at 40% MCR	4.13	3.64
24		Pipelay Vessel stationary (November), operating at 40% MCR	4.11	3.63
27	Artisan-1	Pipelay Vessel stationary (June), operating at 40% MCR	2.87	2.46
28		Pipelay Vessel stationary (November), operating at 40% MCR	2.86	2.46
31	Thylacine North-1 + Geographe-4	Vessel stationary, operating at 40% MCR (Thylacine North-1) + Vessel stationary, operating at 40% MCR + ROV cutting tool (Geographe-4) (June)	3.77	3.29
32		Vessel stationary, operating at 40% MCR (Thylacine North-1) + Vessel stationary, operating at 40% MCR + ROV cutting tool (Geographe-4) (November)	3.76	3.23
33	Artisan-1 + Geographe-4	Vessel stationary, operating at 40% MCR (Artsian-1) + Vessel stationary, operating at 40% MCR + ROV cutting tool (Geographe-4) (June)	3.76	3.24
34		Vessel stationary, operating at 40% MCR (Artsian-1) + Vessel stationary, operating at 40% MCR + ROV cutting tool (Geographe-4) (November)	3.63	3.20
35	Thylacine North-1	MODU Drilling + Platform + Skid installation vessel operating at 40% MCR	6.08	4.99

Table 2. Summary: Maximum (R_{max}) horizontal distances (in km) and ensonified area (km^2) for the frequency-weighted LF-cetacean SEL_{24h} TTS thresholds based on NMFS (2018) from the most appropriate location for considered sources per scenario. MCR: Maximum Continuous Rating, MODU: Mobile Offshore Drilling Unit, OSV: Offshore Supply Vessel, ROV: Remotely Operated Vehicle.

Scenario number	Well Area	Description	R_{max} (km)	Area (km^2)
A1	Thylacine North-1	MODU Drilling	0.39	0.33
A2		OSV under DP	0.95	2.33
A3		OSV Standby Transit	–	–
A4	Thylacine A	Platform Operations	0.04	0.004
A5	Thylacine North-1	MODU Drilling + 4h OSV resupply	1.06	2.49
A6		MODU Drilling + 8h OSV resupply	1.31	4.39
A7		MODU Drilling + OSV Standby Transit	0.39	0.33
1	Thylacine A	Platform + 2h OSV resupply	0.75	1.31
2		Platform + 4h OSV resupply	0.95	2.30
3		Platform + 6h OSV resupply	1.11	3.15
4		Platform + 8h OSV resupply	1.25	4.01
5		Platform 8h + OSV Standby	0.04	0.004
6		Platform + 24h OSV Standby	0.04	0.004
7	Thylacine North-1	Pipelay Vessel stationary (June), operating at 20% MCR	0.60	1.04
8		Pipelay Vessel stationary (November), operating at 20% MCR	0.59	1.04
9		Pipelay Vessel laying pipe (June), operating at 20% MCR	1.18	13.62
10		Pipelay Vessel laying pipe (November), operating at 20% MCR	1.17	13.53
11	Artisan-1	Pipelay Vessel stationary (June), operating at 20% MCR	0.67	1.14
12		Pipelay Vessel stationary (November), operating at 20% MCR	0.67	1.12
13		Pipelay Vessel laying pipe (June), operating at 20% MCR	0.90	10.76
14		Pipelay Vessel laying pipe (November), operating at 20% MCR	0.90	10.69
15	Thylacine North-1 + Geographe-4	Vessel stationary, operating at 20% MCR (Thylacine North-1) + Vessel stationary, operating at 20% MCR + ROV cutting tool (Geographe-4) (June)	0.66	1.35
16		Vessel stationary, operating at 20% MCR (Thylacine North-1) + Vessel stationary, operating at 20% MCR + ROV cutting tool (Geographe-4) (November)	0.66	1.34
17	Artisan-1 + Geographe-4	Vessel stationary, operating at 20% MCR (Artsian-1) + Vessel stationary, operating at 20% MCR + ROV cutting tool (Geographe-4) (June)	0.67	1.35
18		Vessel stationary, operating at 20% MCR (Artsian-1) + Vessel stationary, operating at 20% MCR + ROV cutting tool (Geographe-4) (November)	0.67	1.33
19	Thylacine North-1 + Thylacine A	MODU Drilling + Platform + 4h OSV resupply	0.95	2.31
20		MODU Drilling + Platform + 8h OSV resupply	1.23	4.03
21		MODU Drilling + Platform + Skid installation vessel operating at 20% MCR	0.65	1.10

Scenario number	Well Area	Description	R_{max} (km)	Area (km²)
23	Thylacine North-1	Pipelay Vessel stationary (June), operating at 40% MCR	0.95	2.28
24		Pipelay Vessel stationary (November), operating at 40% MCR	0.94	2.23
25		Pipelay Vessel laying pipe (June), operating at 40% MCR	1.95	24.2
26		Pipelay Vessel laying pipe (November), operating at 40% MCR	1.95	24.1
27	Artisan-1	Pipelay Vessel stationary (June), operating at 40% MCR	0.88	2.02
28		Pipelay Vessel stationary (November), operating at 40% MCR	0.88	1.99
29		Pipelay Vessel laying pipe (June), operating at 40% MCR	1.40	17.1
30		Pipelay Vessel laying pipe (November), operating at 40% MCR	1.39	17.0
31	Thylacine North-1 + Geographe-4	Pipelay Vessel stationary, operating at 40% MCR (Thylacine North-1) + Vessel stationary, operating at 40% MCR + ROV cutting tool (Geographe-4)	0.95	2.39
32		Pipelay Vessel stationary, operating at 40% MCR (Thylacine North-1) + Vessel stationary, operating at 40% MCR + ROV cutting tool (Geographe-4)	0.94	2.38
33	Artisan-1 + Geographe-4	Pipelay Vessel stationary, operating at 40% MCR (Artsian-1) + Vessel stationary, operating at 40% MCR + ROV cutting tool (Geographe-4)	0.91	2.39
34		Vessel stationary, operating at 40% MCR (Pipelay Vessel -1) + Vessel stationary, operating at 40% MCR + ROV cutting tool (Geographe-4)	0.91	2.38
35	Thylacine North-1	MODU Drilling + Platform + Skid installation vessel operating at 40% MCR	0.85	2.10

2. Introduction

JASCO Applied Sciences (JASCO) performed modelling study of underwater sound levels associated with the Beach Energy Otway Development, to supplement drilling and construction results previously presented in Koessler et al. (2020), Matthews et al. (2020) and Matthews et al. (2021).

The results have been revised due to better understanding of the propagation loss in the region gained through the validation monitoring of drilling operations at Artisan-1 McPherson et al. (2021) as described in Section 2.1. An overview of the modelling scenarios considered is provided in Section 2.2, with results presented in Section 4, and briefly discussed in Section 5.

For noise effect criteria and explanations on methodologies applied, refer to Koessler et al. (2020), Matthews et al. (2020), Matthews et al. (2021) and McPherson et al. (2021).

2.1. Validation Monitoring Study Summary

The monitoring study (McPherson et al. 2021) was completed in relation to the exploration drilling activities at the Artisan-1 well with the aim of completing an acoustic characterisation of the drilling and associated vessel activity within the Otway Basin. Through this characterisation, validation of the modelling predictions used in Beach Energy Otway Environment Plans (EPs) for the development drilling activities was required.

The exploration well Artisan-1, drilled by the *Ocean Onyx*, was selected for the monitoring program because the predicted distances to thresholds for effects on marine mammals, including pygmy blue whales, were farthest at

this location in the modelling study used for the EP (Koessler et al. 2020), as well as because it was the first well in the Otway drilling campaign.

Four JASCO Autonomous Multichannel Acoustic Recorders (AMARs) in C-lander moorings were deployed in February and retrieved in early April. Stations 1 through 4 were deployed at distances of 0.336, 1.13, 5.11, and 25 km from the *Ocean Onyx*. The AMARs recorded continuously at 24-bit resolution and 64 kHz sample rate for the entire deployment. The three stations closest to the *Ocean Onyx* were configured with a single hydrophone, whilst the station 25 km away was configured with three hydrophones to provide directional processing of received sounds.

To assist in the characterisation of *Ocean Onyx* and attendant support vessels, the vessels conducted specific activities under dynamic positioning and followed a nominated transit track between the *Ocean Onyx* and Geelong Supply Base. No specific operational requests were made of the *Ocean Onyx* and vessels during normal drilling activities due to the complexity of operationally meeting any requests. Over the course of the monitoring program, the MODU and support vessels engaged in different operational states with different uncontrollable contributors, such as variable drilling operations, resupply and support operations, weather conditions, and merchant shipping.

A summary of the findings of the monitoring study are described in the following sections.

Source Levels

The Monopole Source Levels determined through the measurement study differed from those either estimated for use in the modelling study or those determined using proxy sources. The key differences are as follows:

- The support vessels are quieter than estimated when they are under slow transit speeds, such as 7 knots.
- The support vessels are louder than estimated when they are travelling at faster transit speeds, with 9 knots used to represent these speeds and the associated MSL.
- The support vessels are louder than estimated when holding station or moving under dynamic positioning.
- The drilling operations of the *Ocean Onyx* are both louder at some frequencies and quieter at others than those for the proxy rig the *Polar Pioneer* (Austin et al. 2018), although the results presented for the *Polar Pioneer* did not examine the changes in level with increased drilling depth (over time) as completed within this study.

Comparison of Results

The results from the measurement study could not be directly compared to the modelling presented in Koessler et al. (2020) due to the differences in actual events compared to the nominal representative scenarios developed and evaluated as part of the EP assessment process. Additionally, the measurements were obtained at a receiver located 1.2 m off the seafloor, which is not the maximum-over-depth results reported in the modelling study. The ranges obtained from the measurement study were reported in relation to the Artisan-1 well location, and thus the centre of the *Ocean Onyx*. The ranges in project related modelling studies are reported from a range of locations, including the centroids of multiple sources, thus it was not possible to report the measurement results in a similar fashion using the small number of recording locations used in this study.

Geological Environment Representation

Previous modelling studies for Beach Energy, Koessler et al. (2020), Matthews et al. (2020) and Matthews et al. (2021), used MONM with the assumption of a 1 m thick layer of sand overlaying the carbonate seabed structure at the Artisan-1 well location. This assumption was made due to the lack of available information, and is similar to other inshore work in the Otway Basin, such as (Duncan et al. 2012), who represented the shelf as two zones, an in-shore zone out to a water depth of about 70 m in which the sand layer has a thickness of between 4–10 m, and an off-shore zone of effectively bare calcarenite probably due to scouring by current and swell. The transition between these two zones is ill-defined due to a lack of datapoints, and lies close to the Artisan-1 location, and a balanced approach of assuming 1 m thick layer of sand overlaying the carbonate seabed structure was judged to be appropriate given available information.

The measurement study has increased the understanding of the geological environment in the region and indicates that the sand overlay is thinner (or non-existent) at shallower water depths. The different environment required the use of an alternate configuration of numerical models to represent the propagation loss.

Propagation Loss

The accuracy of the broadband calculated propagation loss for the Otway Basin continental shelf environment depends significantly upon the frequency content of the radiating sound source together with thickness of the sand layer on carbonate seabed (calcarenite) likely to occur within the region. In general, the thinner the sand layer, the greater the overall propagation loss.

When comparing SPL data fits for Stations 1–3 in McPherson et al. (2021), the loss rate is higher than what would have been expected in this environment, considering the higher monopole source levels for the support vessel on DP derived from trial measurements. The differences are likely attributable to the potential absence of a sand veneer.

Comparisons were conducted using JASCO's Marine Operations Noise Model (MONM), a wide-angle parabolic equation model which applies the BELLHOP Gaussian beam acoustic ray-trace model at higher frequencies, and JASCO's wavenumber integration model (VSTACK) which can fully account for the elasto-acoustic properties of the sub-bottom. The agreement between the models was excellent when only a comparatively thin (1 m thick) layer of sand overlies the carbonate seabed structure. In an environment such as this, MONM could have been used without correction. However, the comparisons indicate a much higher rates of loss, as would be expected if no (or only a very thin) sand layer were present.

A better understanding of the propagation loss environment, and the revision of the representation and treatment of it through the measurement study, enabled the modelling scenarios for the activities at Artisan-1 presented in Koessler et al. (2020) to be recalculated (Section 6.3 in McPherson et al. (2021)).

2.2. Scenario Details

The scenarios considered within this assessment are detailed below and in Table 3, with the associated modelling sites provided in Table 4. An overview of the scenarios is as follows:

1. Otway Offshore Project Development Drilling Campaign, Thylacine North-1 Operations:
    a. Mobile Offshore Drilling Unit (MODU) conducting normal drilling operations
    b. MODU with Offshore Supply Vessel (OSV) in attendance, standing by and conducting resupply operations under Dynamic Positioning (DP)
2. Otway Offshore Project Operations scenarios:
    1. Operations of the Thylacine platform (at Thylacine-A)
    2. OSV vessel resupply at Thylacine platform for periods of 2, 4, 6 and 8 hrs.
    3. OSV vessel on standby at Thylacine platform for periods of 8 and 24 hrs
4. Otway Offshore Project Construction scenarios: A single nominated pipelay/construction vessel, the Skandi Singapore, was considered for these scenarios. Each scenario was considered with a sound speed profiles for the 'worst case over the year' and for the period pygmy blue whales are present in the region, between November and January:
    a. Pipelay vessel (PLV) both stationary and laying pipe at Thylacine North-1 and Artisan-1 operating at 20% of its Maximum Continuous Rating (MCR).
    b. Pipelay vessel operating a Remotely Operated Vehicle (ROV) and cutting tool at Geographe-4. The vessel at Geographe-4 was also modelled operating at 20% and 40% of its Maximum Continuous Rating (MCR).
    c. Quantitively assess the combined sound levels of drilling activities and the construction vessel(s) at the emerging SRW aggregation area at Port Campbell. This scenario considered the drilling activities at

Thylacine North-1 presented in Koessler et al. (2020) and the nominated construction vessel (Skandi Singapore) operating at Geographe-4.

5. Simultaneous assessment for drilling, operations and construction operations were considered for key scenarios:
   a. Drilling at Thylacine while doing Thylacine platform resupply
   b. Drilling at Thylacine while doing installation of Thylacine skid near Thylacine platform. The construction vessel installing the skid was modelled operating at 20% and 40% of its Maximum Continuous Rating (MCR).

Table 3. Description of modelled scenarios. MCR: Maximum Continuous Rating, MODU: Mobile Offshore Drilling Unit, OSV: Offshore Supply Vessel, ROV: Remotely Operated Vehicle.

Scenario number	Well Name	Description	SSP Month	Modelled sites
A1	Thylacine North-1	MODU Drilling	June	1
A2		OSV under DP	June	2
A3		OSV Standby Transit	June	3
A4	Thylacine A	Platform Operations	June	4
A5	Thylacine North-1	MODU Drilling + 4h OSV resupply	June	1,2,3
A6		MODU Drilling + 8h OSV resupply	June	1,2,3
A7		MODU Drilling + OSV Standby Transit	June	1,3
1	Thylacine A	Platform + 2h OSV resupply	June	4,5
2		Platform + 4h OSV resupply	June	4,5
3		Platform + 6h OSV resupply	June	4,5
4		Platform + 8h OSV resupply	June	4,5
5		Platform 8h + OSV Standby	June	3,5
6		Platform + 24h OSV Standby	June	3,5
7	Thylacine North-1	Pipelay Vessel stationary, operating at 20% MCR	June	6
8		Pipelay Vessel stationary, operating at 20% MCR	November	6
9		Pipelay Vessel laying pipe, operating at 20% MCR	June	6
10		Pipelay Vessel laying pipe, operating at 20% MCR	November	6
11	Artisan-1	Pipelay Vessel stationary, operating at 20% MCR	June	7
12		Pipelay Vessel stationary, operating at 20% MCR	November	7
13		Pipelay Vessel laying pipe, operating at 20% MCR	June	7
14		Pipelay Vessel laying pipe, operating at 20% MCR	November	7
15	Thylacine North-1 + Geographe-4	Pipelay Vessel stationary, operating at 20% MCR (Thylacine North-1) + Vessel stationary, operating at 20% MCR + ROV cutting tool (Geographe-4)	June	6,8,9
16		Pipelay Vessel stationary, operating at 20% MCR (Thylacine North-1) + Vessel stationary, operating at 20% MCR + ROV cutting tool (Geographe-4)	November	6,8,9

Scenario number	Well Name	Description	SSP Month	Modelled sites
17	Artisan-1 + Geographe-4	Pipelay Vessel stationary, operating at 20% MCR (Artsian-1) + Vessel stationary, operating at 20% MCR + ROV cutting tool (Geographe-4)	June	7,8,9
18	Artisan-1 + Geographe-4	Vessel stationary, operating at 20% MCR (Pipelay Vessel -1) + Vessel stationary, operating at 20% MCR + ROV cutting tool (Geographe-4)	November	7,8,9
19	Thylacine North-1 + Thylacine A	MODU Drilling + Platform + 4h OSV resupply	June	1,4,5
20		MODU Drilling + Platform + 8h OSV resupply	June	1,4,5
21		MODU Drilling + Platform + Skid installation vessel at 20% MCR	June	1,4,6
22	Thylacine North-1 + Geographe-4	MODU Drilling + 8h OSV resupply (Thylacine North-1) + Vessel stationary, operating at 20% MCR + ROV cutting tool (Geographe-4)	June	1,2,3,8,9
23	Thylacine North-1	Pipelay Vessel stationary, operating at 40% MCR	June	6
24		Pipelay Vessel stationary, operating at 40% MCR	November	6
25		Pipelay Vessel laying pipe, operating at 40% MCR	June	6
26		Pipelay Vessel laying pipe, operating at 40% MCR	November	6
27	Artisan-1	Pipelay Vessel stationary, operating at 40% MCR	June	7
28		Pipelay Vessel stationary, operating at 40% MCR	November	7
29		Pipelay Vessel laying pipe, operating at 40% MCR	June	7
30		Pipelay Vessel laying pipe, operating at 40% MCR	November	7
31	Thylacine North-1 + Geographe-4	Pipelay Vessel stationary, operating at 40% MCR (Thylacine North-1) + Vessel stationary, operating at 40% MCR + ROV cutting tool (Geographe-4)	June	6,8,9
32		Pipelay Vessel stationary, operating at 40% MCR (Thylacine North-1) + Vessel stationary, operating at 40% MCR + ROV cutting tool (Geographe-4)	November	6,8,9
33	Artisan-1 + Geographe-4	Pipelay Vessel stationary, operating at 40% MCR (Artsian-1) + Vessel stationary, operating at 40% MCR + ROV cutting tool (Geographe-4)	June	7,8,9
34		Vessel stationary, operating at 40% MCR (Pipelay Vessel -1) + Vessel stationary, operating at 40% MCR + ROV cutting tool (Geographe-4)	November	7,8,9

35	Thylacine North-1	MODU Drilling + Platform + Skid installation at 40% MCR	June	1,4,6
36	Thylacine North-1 + Geographe-4	MODU Drilling + 8h OSV resupply (Thylacine North-1) + Vessel stationary, operating at 40% MCR + ROV cutting tool (Geographe-4)	June	1,2,3,8,9

Table 4. Location details for the modelled sites. MODU: Mobile Offshore Drilling Unit, OSV: Offshore Supply Vessel, PLV: Pipelay Vessel, ROV: Remotely Operated Vehicle, WHP: Well Head Platform

Well	**Site**	**Source**	**Latitude (S)**	**Longitude (E)**	**MGA Zone 54 (GDA94)**		**Water depth (m)**
					X (m)	*Y* (m)	
Thylacine North-1	1	MODU	39° 12.51001'	142° 52.49601'	661882	5658411	99.1
	2	OSV	39° 12.48903'	142° 53.88508'	663882	5658408	99.1
	3	OSV standby	39° 12.50986'	142° 52.54039'	661946	5658410	99.2
Thylacine A	4	WHP	39° 14.40200'	142° 54.60100'	664838	5654848	102.4
	5	OSV	39° 14.40059'	142° 54.64574'	664902	5654849	102.3
Thylacine North-1	6	PLV	39° 12.51001'	142° 52.49601'	661882	5658411	99.1
Artisan-1	7	PLV	38° 53.45684'	142° 52.97408'	663300	5693640	71.5
Geographe-4	8	PLV	39° 6.49400'	142° 57.06700'	668700	5669400	85.0
	9	*ROV Cutting Tool*	39° 6.49400'	142° 57.06700'	668700	5669400	85.0
Thylacine North-1	10	OSV	39° 14.40200'	142° 54.60100'	664838	5654848	102.4

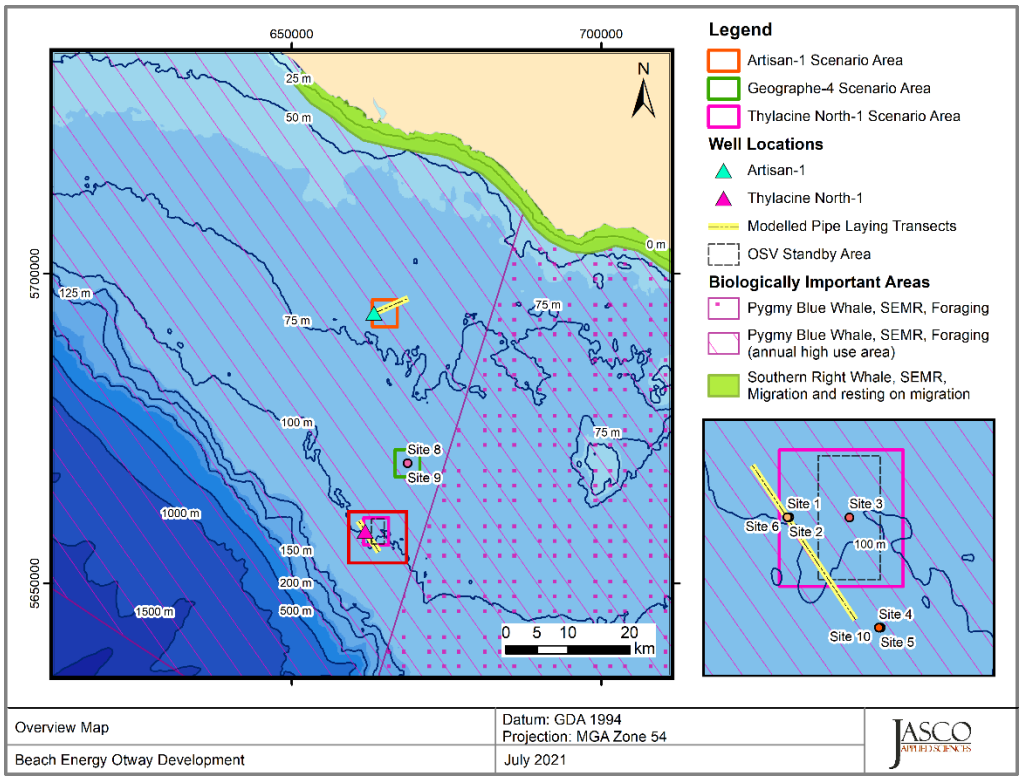

Figure 1. Overview of the modelled area (focus on Thylacine North-1 Scenario Area) and local features within the South East Marine Region (SEMR).

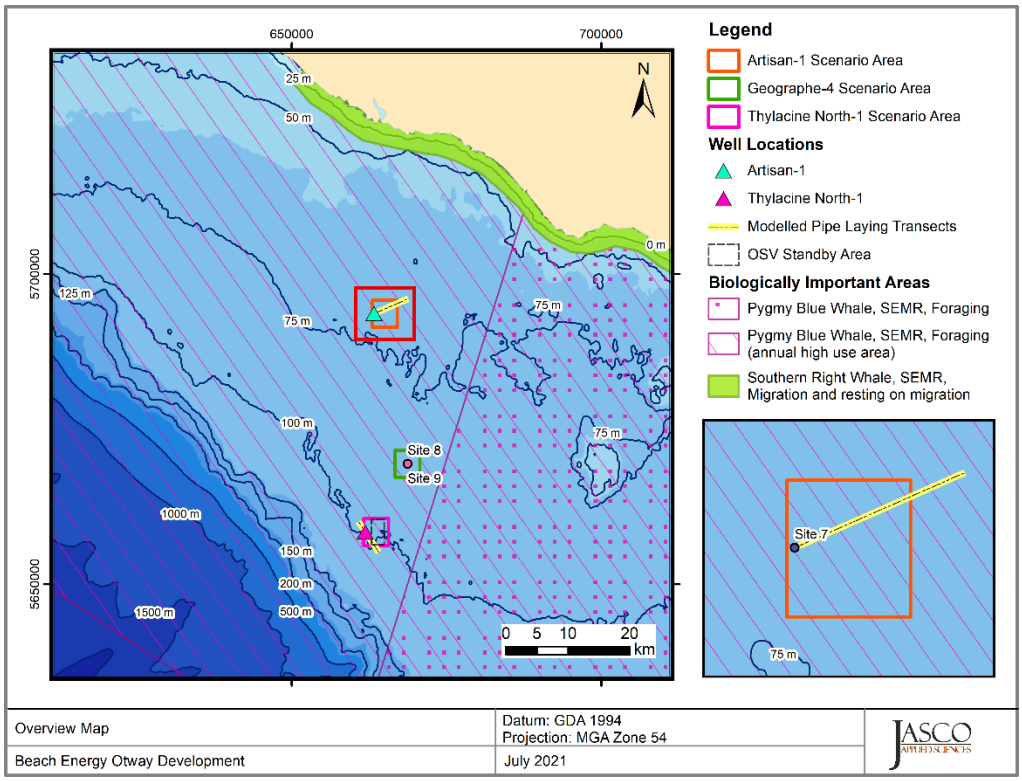

Figure 2. Overview of the modelled area (focus on Artisan-1 Scenario Area) and local features within the South East Marine Region (SEMR).

3. Methods and Parameters

A details description of the employed modelling method and input parameters can be found in refer to Koessler et al. (2020), Matthews et al. (2020), Matthews et al. (2021), Connell et al. (2021) and McPherson et al. (2021). A brief a summary of key elements used in this addendum are provided as follows.

The measured monopole source levels (MSLs) and spectra for the MODU and OSV were used here from McPherson et al. (2021):

- For the MODU drilling, mean levels from Section 5.5.1 in McPherson et al. (2021) were used.
- For scenarios where the OSV was under dynamic positioning (DP) the average spectrum from Section 5.5.2 in McPherson et al. (2021) was used.
- For scenarios where the OSV was transiting or standing by the average slow transit (7 knots) spectrum in McPherson et al. (2021) was used.

For the construction phase scenarios, estimates of the energy source levels (ESLs) for the pipelay/construction vessel were based on the specifications of the *Skandi Singapore* and an ESL derived from recordings of the TechnipFMC flexible lay and construction vessel *Deep Orient*. The specifications of proxy vessel and details on scaling can be found in Matthews et al. (2020), Matthews et al. (2021) and Connell et al. (2021).

Fixed structures such as the WHP have lower radiated sound levels than floating platforms (Spence et al. 2007). Equipment operating onboard floating platforms can contribute to marine environment sound however, airborne and structure-borne (vibration) pathways are considered more significant on these facilities, where equipment can be located below the water line. Underwater noise produced from platforms standing on metal jack-up legs is relatively low given the small surface areas available for sound transmission and also given the location of machinery above the waterline. It is therefore expected that the dominant pathway for sound generation is structure-borne (i.e., vibration from machinery passing through the legs) (Spence et al. 2007).

A study involving the Endeavour Jack-up Rig, operating in Cook Inlet, was conducted by Illingworth and Rodkin (2014) during drilling activities. The results from the sound source verification indicated that sound generated from drilling or generators were below ambient sound levels. The generators used on the Endeavour are mounted on pedestals specifically to reduce sound transfer through the infrastructure, and they are enclosed in an insulated engine room, which may have reduced further underwater sound transmission to levels below those generated by the Spartan 151. The sound source verification revealed that the submersed deep-well pumps that charge the fire-suppression system and cool the generators (in a closed water system) were the most likely dominant contributor the sound field. The measurements are reported as near-source levels recorded close to the bow leg pump system (at 10 m range) (Figure 3-5 in Illingworth and Rodkin Inc. (2014). These were backpropagated using spherical spreading to determine an energy source level (ESL) spectrum. Considering the similarities between a Jack-up Rig and a static WHP the decidecade band spectrum is shown in Figure 3 was used in modelling noise emissions from the Thylacine-A platform.

Furthermore, as discussed by (McPherson et al. 2021) and discussed above in Section 2.1, significant rates of propagation loss were found when analysing the data from the measurement study. As part of the model-measurement validation an adjustment factor was applied broadband received level predictions to account for the loss associated with a cemented limestone seabed (calcarenite) (Section 6.2 in McPherson et al. (2021)). A similar adjustment, which only differed by accounting for sources in different water depths, was applied to broadband level predictions in this addendum as a very similar type of seabed environment is expected at the Thylacine scenario area

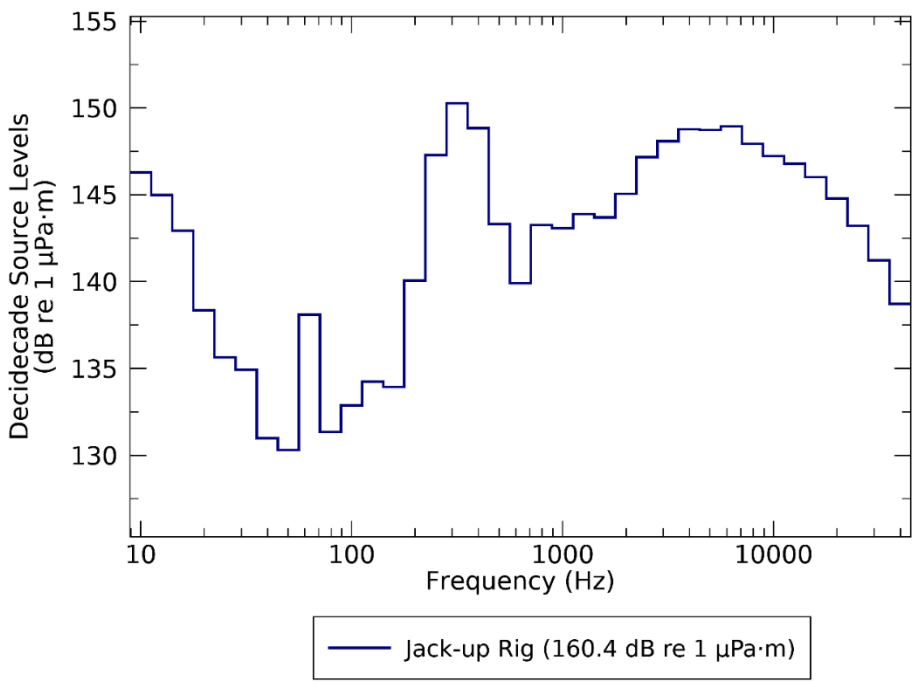

Figure 3. Energy source level (ESL) spectra (in decidecade frequency-band) for the Jack-up Rig considered as a proxy source for the Thylacine WHP.

4. Results

For the considered scenarios (described in Section 2.2), the maximum-over-depth sound fields for the modelled scenarios are presented below in two formats: as tables of distances to sound levels and, where the distances are long enough, as contour maps showing the directivity and distance to various sound levels. Distances to isopleths/thresholds were reported from either the centroid of several sources or from the most dominant single source. When an isopleth completely envelopes multiple sources the centroid was used. When several closed isopleths exist the most dominant source was used.

Tables 5–7 present the maximum and 95% distances (defined in Appendix B.1) to SPL isopleths. Since the SPL metric does not depend on the duration of the operation, these estimates are valid for both, stationary and non-stationary scenarios. Tables 11–16 present the distances to frequency-weighted SEL_{24h} threshold, as well as the total ensonified area for all scenarios.

The maximum-over-depth sound fields for nine scenarios (described in Section were extracted at the emerging SRW aggregation area at Port Campbell, and can be compared to the 120 dB re 1 µPa threshold for marine mammal behavioural response to continuous noise (NOAA 2019).

4.1. Tabulated Results

Table 5. *Scenarios A1–A7:* Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) to sound pressure level (SPL) from the most appropriate location for considered sources per scenarioA dash indicates the level was not reached within the limits of the modelling resolution (20 m). MODU: Mobile Offshore Drilling Unit, OSV: Offshore Supply Vessel, DP: Dynamic Positioning.

SPL (L_p; dB re 1 µPa)	**MODU Drilling (Scenario A1)**		**OSV under DP (Scenario A2)**		**OSV Standby Transit (Scenario A3)**		**Platform (Scenario A4)**		**MODU Drilling and OSV Resupply (Scenario A5)**		**MODU Drilling and OSV Standby (Scenario A7)**	
	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)
180	–	–	–	–	–	–	–	–	0.05	0.05	–	–
170[A]	–	–	–	–	–	–	–	–	0.05	0.05	–	–
160	–	–	0.08	0.08	–	–	–	–	0.11	0.10	–	–
158[B]	–	–	0.13	0.12	–	–	–	–	0.15	0.15	–	–
150	–	–	0.32	0.31	–	–	–	–	0.36	0.31	–	–
140	0.09	0.09	0.87	0.81	–	–	–	–	0.88	0.82	0.09	0.09
130	0.38	0.35	2.3	2.15	0.17	0.16	–	–	2.51	2.18	0.38	0.35
120[C]	1.24	1.12	7.10	6.50	0.38	0.35	0.20	0.19	7.89	6.56	1.32	1.19

[A] 48 h threshold for recoverable injury for fish with a swim bladder involved in hearing (Popper et al. 2014).
[B] 12 h threshold for TTS for fish with a swim bladder involved in hearing (Popper et al. 2014).
[C] Threshold for marine mammal behavioural response to continuous noise (NOAA 2019).

Table 6. *Scenarios 1–11:* Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) to sound pressure level (SPL) from the most appropriate location for considered sources per scenario. A dash indicates the level was not reached within the limits of the modelling resolution (20 m). OSV: Offshore Supply Vessel, PLV: Pipelay Vessel.

SPL (L_p; dB re 1 µPa)	**Platform and OSV resupply (Scenario 1)**		**Platform and OSV standby (Scenario 5)**		**PLV stationary operating at 20% MCR, Thylacine**				**PLV stationary operating at 20% MCR, Artisan**			
					June (Scenario 7)		**November (Scenario 8)**		**June (Scenario 11)**		**November (Scenario 12)**	
	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)
180	–	–	–	–	–	–	–	–	–	–	–	–
170[A]	–	–	–	–	–	–	–	–	–	–	–	–
160	0.08	0.08	–	–	–	–	–	–	–	–	–	–
158[B]	0.14	0.09	–	–	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
150	0.28	0.27	–	–	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
140	0.85	0.80	–	–	0.33	0.32	0.33	0.32	0.29	0.29	0.29	0.29
130	2.48	2.18	0.17	0.16	0.95	0.85	0.94	0.84	0.87	0.80	0.87	0.80
120[C]	7.31	6.56	0.45	0.43	2.71	2.57	2.70	2.55	2.27	2.09	2.26	2.02

[A] 48 h threshold for recoverable injury for fish with a swim bladder involved in hearing (Popper et al. 2014).
[B] 12 h threshold for TTS for fish with a swim bladder involved in hearing (Popper et al. 2014).
[C] Threshold for marine mammal behavioural response to continuous noise (NOAA 2019).

Table 7. *Scenarios 15–21:* Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) to sound pressure level (SPL) from the most appropriate location for considered sources per scenario. A dash indicates the level was not reached within the limits of the modelling resolution (20 m). MODU: Mobile Offshore Drilling Unit, OSV: Offshore Supply Vessel, PLV: Pipelay Vessel, ROV: Remotely Operated Vehicle.

SPL (L_p; dB re 1 µPa)	**PLV stationary operating at 20% MCR, at Thylacine and ROV Operations at Geographe-4**				**PLV stationary operating at 20% MCR, at Artisan and ROV Operations at Geographe-4**				**MODU Drilling, Platform and OSV resupply**		**MODU Drilling, Platform and Skid installation vessel at 20% MCR**	
	June (Scenario 15)		**November (Scenario 16)**		**June (Scenario 17)**		**November (Scenario 18)**		**(Scenario 19)**		**(Scenario 21)**	
	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)
180	–	–	–	–	–	–	–	–	–	–	–	–
170[A]	–	–	–	–	–	–	–	–	–	–	–	–
160	–	–	–	–	–	–	–	–	0.08	0.08	–	–
158[B]	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.14	0.09	0.04	0.04
150	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.28	0.27	0.09	0.09
140	0.32	0.31	0.32	0.31	0.32	0.31	0.32	0.31	0.85	0.80	0.31	0.30
130	0.91	0.86	0.91	0.84	0.91	0.86	0.91	0.84	2.48	2.18	0.85	0.83
120[C]	2.98	2.76	2.97	2.73	2.98	2.75	2.97	2.72	7.90	6.65	4.85	4.29

[A] 48 h threshold for recoverable injury for fish with a swim bladder involved in hearing (Popper et al. 2014).
[B] 12 h threshold for TTS for fish with a swim bladder involved in hearing (Popper et al. 2014).
[C] Threshold for marine mammal behavioural response to continuous noise (NOAA 2019).

Table 8. *Scenarios 23–24, 27–28:* Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) to sound pressure level (SPL) from the most appropriate location for considered sources per scenario. A dash indicates the level was not reached within the limits of the modelling resolution (20 m). OSV: Offshore Supply Vessel, PLV: Pipelay Vessel.

SPL (L_p; dB re 1 µPa)	**PLV stationary operating at 40% MCR, Thylacine**				**PLV stationary operating at 40% MCR, Artisan**			
	June (Scenario 23)		**November (Scenario 24)**		**June (Scenario 27)**		**November (Scenario 28)**	
	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)
180	–	–	–	–	–	–	–	–
170[A]	–	–	–	–	–	–	–	–
160	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
158[B]	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
150	0.17	0.17	0.17	0.17	0.16	0.15	0.16	0.15
140	0.44	0.43	0.44	0.43	0.39	0.38	0.39	0.38
130	1.26	1.18	1.27	1.17	1.12	1.10	1.12	1.09
120[C]	4.13	3.64	4.11	3.63	2.87	2.46	2.86	2.46

[A] 48 h threshold for recoverable injury for fish with a swim bladder involved in hearing (Popper et al. 2014).
[B] 12 h threshold for TTS for fish with a swim bladder involved in hearing (Popper et al. 2014).
[C] Threshold for marine mammal behavioural response to continuous noise (NOAA 2019).

Table 9. *Scenarios 31–35:* Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) to sound pressure level (SPL) from the most appropriate location for considered sources per scenario. A dash indicates the level was not reached within the limits of the modelling resolution (20 m). MODU: Mobile Offshore Drilling Unit, OSV: Offshore Supply Vessel, PLV: Pipelay Vessel, ROV: Remotely Operated Vehicle.

SPL (L_p; dB re 1 µPa)	PLV stationary operating at 40% MCR, at Thylacine and ROV Operations at Geographe-4				PLV stationary operating at 40% MCR, at Artisan and ROV Operations at Geographe-4				MODU Drilling, Platform and Skid Installation Vessel operating at 40% MCR	
	June (Scenario 31)		November (Scenario 32)		June (Scenario 33)		November (Scenario 34)		(Scenario 35)	
	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)
180	–	–	–	–	–	–	–	–	–	–
170[A]	–	–	–	–	–	–	–	–	–	–
160	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
158[B]	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
150	0.16	0.15	0.16	0.16	0.16	0.15	0.16	0.16	0.15	0.14
140	0.46	0.41	0.46	0.4	0.46	0.41	0.46	0.40	0.42	0.38
130	1.56	1.26	1.56	1.25	1.56	1.26	1.56	1.25	1.39	1.14
120[C]	3.77	3.29	3.76	3.23	3.76	3.24	3.63	3.20	6.08	4.99

[A] 48 h threshold for recoverable injury for fish with a swim bladder involved in hearing (Popper et al. 2014).
[B] 12 h threshold for TTS for fish with a swim bladder involved in hearing (Popper et al. 2014).
[C] Threshold for marine mammal behavioural response to continuous noise (NOAA 2019).

Table 10. Received SPL at the Port Campbell SRW receiver for relevant scenarios.

Scenario	Description	Location(s)	SPL (Lp; dB re 1 µPa) at Port Campbell SRW Receiver
22	MODU Drilling + 8h OSV resupply (Thylacine North-1) + Vessel stationary, operating at 20% MCR + ROV cutting tool (Geographe-4)	Thylacine North-1 + Geographe-4	93.8
36	MODU Drilling + 8h OSV resupply (Thylacine North-1) + Vessel stationary, operating at 40% MCR + ROV cutting tool (Geographe-4)	Thylacine North-1 + Geographe-4	94.1

Table 11. *Scenarios A1-A7:* Maximum (R_{max}) horizontal distances (in km) to frequency-weighted SEL_{24h} PTS and TTS thresholds based on NMFS (2018) and Finneran et al. (2017) from the most appropriate location for considered sources per scenario, and ensonified area (km^2). A dash indicates the level was not reached within the limits of the modelling resolution (20 m). MODU: Mobile Offshore Drilling Unit, OSV: Offshore Supply Vessel.

Hearing group	SEL_{24h} threshold ($L_{E,24h}$; dB re 1 µPa²·s)†	MODU Drilling (Scenario A1)		OSV under DP (Scenario A2)		OSV Standby Transit (Scenario A3)		Platform (Scenario A4)		MODU Drilling and 4h OSV resupply (Scenario A5)		MODU Drilling and 8h OSV resupply (Scenario A6)		MODU Drilling and OSV Standby Transit (Scenario A7)	
		R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)
PTS															
LF cetaceans	199	0.03	0.004	0.09	0.03	–	–	0.02	0.001	0.12	0.03	0.18	0.08	0.06	0.004
MF cetaceans	198	0.02	0.001	0.02	0.001	–	–	0.02	0.001	0.05	0.002	0.05	0.002	0.04	0.001
HF cetaceans	173	0.23	0.16	0.06	0.01	–	–	0.03	0.004	0.26	0.16	0.26	0.17	0.26	0.16
Phocid seals	201	0.02	0.001	0.03	0.003	–	–	0.02	0.001	0.05	0.004	0.07	0.01	0.04	0.001
Otariid seals	219	–	–	–	–	–	–	–	–	0.03	0.001	0.05	0.001	–	–
Turtles	220	–	–	0.02	0.001	–	–	–	–	0.05	0.002	0.05	0.002	–	–
TTS															
LF cetaceans	179	0.39	0.33	0.95	2.33	–	–	0.04	0.004	1.06	2.49	1.31	4.39	0.39	0.33
MF cetaceans	178	0.13	0.06	0.06	0.01	–	–	0.03	0.003	0.16	0.06	0.16	0.07	0.13	0.06
HF cetaceans	153	1.12	3.22	0.47	0.69	–	–	0.30	0.28	1.16	3.71	1.16	3.99	1.12	3.22
Phocid seals	181	0.12	0.04	0.28	0.24	–	–	0.03	0.00	0.32	0.27	0.46	0.55	0.12	0.04
Otariid seals	199	0.02	0.001	0.04	0.01	–	–	0.02	0.001	0.07	0.01	0.09	0.01	0.02	0.001
Turtles	200	0.02	0.002	0.07	0.02	–	–	0.02	0.001	0.10	0.02	0.16	0.06	0.02	0.002

Table 12. *Scenarios 1–6:* Maximum (R_{max}) horizontal distances (in km) to frequency-weighted SEL_{24h} PTS and TTS thresholds based on NMFS (2018) and Finneran et al. (2017) from the most appropriate location for considered sources per scenario, and ensonified area (km²). A dash indicates the level was not reached within the limits of the modelling resolution (20 m), OSV: Offshore Supply Vessel.

Hearing group	SEL_{24h} threshold ($L_{E,24h}$; dB re 1 µPa²·s)†	Platform and OSV resupply 2 h (Scenario 1)		Platform and OSV resupply 4 h (Scenario 2)		Platform and OSV resupply 6 h (Scenario 3)		Platform and OSV resupply 8 h (Scenario 4)		Platform and OSV 8h standby (Scenario 5)		Platform and OSV 24h standby (Scenario 6)	
		R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)
PTS													
LF cetaceans	199	0.10	0.02	0.12	0.03	0.14	0.04	0.18	0.07	0.02	0.001	0.02	0.001
MF cetaceans	198	0.05	0.001	0.05	0.001	0.05	0.002	0.05	0.002	0.02	0.001	0.02	0.001
HF cetaceans	173	0.08	0.01	0.09	0.02	0.10	0.02	0.11	0.02	0.03	0.004	0.03	0.004
Phocid seals	201	0.05	0.002	0.06	0.004	0.06	0.01	0.08	0.01	0.02	0.001	0.02	0.001
Otariid seals	219	–	–	–	–	–	–	–	–	–	–	–	–
Turtles	220	–	–	–	–	0.04	0.001	0.04	0.001	–	–	–	–
TTS													
LF cetaceans	179	0.75	1.31	0.95	2.30	1.11	3.15	1.25	4.01	0.04	0.004	0.04	0.004
MF cetaceans	178	0.06	0.01	0.08	0.01	0.09	0.02	0.10	0.02	0.03	0.003	0.03	0.003
HF cetaceans	153	0.45	0.60	0.52	0.79	0.60	1.05	0.63	1.17	0.30	0.28	0.30	0.28
Phocid seals	181	0.23	0.12	0.30	0.24	0.37	0.36	0.43	0.46	0.03	0.00	0.03	0.00
Otariid seals	199	0.06	0.004	0.07	0.01	0.08	0.01	0.08	0.01	0.02	0.001	0.02	0.001
Turtles	200	0.08	0.01	0.10	0.02	0.11	0.02	0.17	0.04	0.02	0.001	0.02	0.001

Table 13. *Scenarios 7–10:* Maximum (R_{max}) horizontal distances (in km) to frequency-weighted SEL_{24h} PTS and TTS thresholds based on NMFS (2018) and Finneran et al. (2017) from the most appropriate location for considered sources per scenario, and ensonified area (km²). A dash indicates the level was not reached within the limits of the modelling resolution (20 m), PLV: Pipelay Vessel.

Hearing group	SEL_{24h} threshold ($L_{E,24h}$; dB re 1 µPa²·s)†	PLV stationary operating at 20% MCR, at Thylacine				PLV laying pipe operating at 20% MCR, at Thylacine			
		June (Scenario 7)		November (Scenario 8)		June (Scenario 9)		November (Scenario 10)	
		R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)
PTS									
LF cetaceans	199	0.06	0.01	0.06	0.01	0.02	0.21	0.02	0.21
MF cetaceans	198	0.02	0.001	0.02	0.001	0.01	0.02	0.01	0.02
HF cetaceans	173	0.09	0.03	0.09	0.03	0.03	0.37	0.03	0.36
Phocid seals	201	0.02	0.001	0.02	0.001	0.01	0.14	0.01	0.14
Otariid seals	219	–	–	–	–	–	–	–	–
Turtles	220	0.02	0.001	0.02	0.001	–	–	–	–
TTS									
LF cetaceans	179	0.60	1.04	0.59	1.04	1.18	13.62	1.17	13.53
MF cetaceans	178	0.07	0.02	0.07	0.02	0.02	0.22	0.02	0.22
HF cetaceans	153	0.84	2.02	0.70	1.36	1.19	15.04	1.46	16.02
Phocid seals	181	0.19	0.12	0.19	0.12	0.13	1.54	0.13	1.54
Otariid seals	199	0.02	0.001	0.02	0.001	0.01	0.15	0.01	0.15
Turtles	200	0.08	0.02	0.08	0.02	0.02	0.27	0.02	0.27

Table 14. *Scenarios 11–14:* Maximum (R_{max}) horizontal distances (in km) to frequency-weighted SEL_{24h} PTS and TTS thresholds based on NMFS (2018) and Finneran et al. (2017) from the most appropriate location for considered sources per scenario, and ensonified area (km²). A dash indicates the level was not reached within the limits of the modelling resolution (20 m), PLV: Pipelay Vessel.

Hearing group	SEL_{24h} threshold ($L_{E,24h}$; dB re 1 µPa²·s)†	PLV stationary operating at 20% MCR, at Artisan				PLV laying pipe operating at 20% MCR, at Artisan			
		June (Scenario 11)		November (Scenario 12)		June (Scenario 13)		November (Scenario 14)	
		R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)
PTS									
LF cetaceans	199	0.06	0.01	0.06	0.01	0.02	0.25	0.02	0.25
MF cetaceans	198	0.01	0.001	0.01	0.001	–	–	–	–
HF cetaceans	173	0.09	0.03	0.09	0.03	0.03	0.37	0.03	0.37
Phocid seals	201	0.02	0.001	0.02	0.001	0.02	0.13	0.02	0.13
Otariid seals	219	–	–	–	–	–	–	–	–
Turtles	220	0.01	0.001	0.01	0.001	–	–	–	–
TTS									
LF cetaceans	179	0.67	1.14	0.67	1.12	0.90	10.76	0.90	10.69
MF cetaceans	178	0.07	0.02	0.07	0.02	0.03	0.30	0.03	0.30
HF cetaceans	153	0.77	1.60	0.62	1.18	0.95	11.92	0.91	10.68
Phocid seals	181	0.19	0.11	0.19	0.11	0.12	1.36	0.12	1.36
Otariid seals	199	0.02	0.001	0.02	0.001	0.02	0.22	0.02	0.22
Turtles	200	0.07	0.02	0.07	0.02	0.03	0.29	0.03	0.29

Table 15. *Scenarios 15–18:* Maximum (R_{max}) horizontal distances (in km) to frequency-weighted SEL_{24h} PTS and TTS thresholds based on NMFS (2018) and Finneran et al. (2017) from the most appropriate location for considered sources per scenario, and ensonified area (km²). A dash indicates the level was not reached within the limits of the modelling resolution (20 m), PLV: Pipelay Vessel, ROV: Remotely Operated Vehicle.

Hearing group	SEL_{24h} threshold ($L_{E,24h}$; dB re 1 µPa²·s)†	PLV stationary operating at 20% MCR, at Thylacine and ROV Operations at Geographe-4				PLV stationary operating at 20% MCR, at Artisan and ROV Operations at Geographe-4			
		June (Scenario 15)		November (Scenario 16)		June (Scenario 17)		November (Scenario 18)	
		R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)
PTS									
LF cetaceans	199	0.06	0.01	0.06	0.01	0.06	0.01	0.06	0.01
MF cetaceans	198	0.02	0.001	0.02	0.001	0.02	0.001	0.02	0.001
HF cetaceans	173	0.12	0.04	0.11	0.04	0.12	0.04	0.11	0.04
Phocid seals	201	0.02	0.001	0.02	0.001	0.02	0.001	0.02	0.001
Otariid seals	219	0.01	0.001	0.01	0.001	0.01	0.001	0.01	0.001
Turtles	220	0.02	0.001	0.02	0.001	0.01	0.001	0.01	0.001
TTS									
LF cetaceans	179	0.66	1.35	0.66	1.34	0.67	1.35	0.67	1.33
MF cetaceans	178	0.09	0.03	0.09	0.03	0.09	0.03	0.09	0.03
HF cetaceans	153	0.87	2.37	0.83	1.93	0.87	2.37	0.83	1.93
Phocid seals	181	0.19	0.12	0.19	0.12	0.19	0.11	0.19	0.11
Otariid seals	199	0.02	0.001	0.02	0.001	0.02	0.001	0.02	0.001
Turtles	200	0.08	0.02	0.08	0.02	0.08	0.02	0.08	0.02

Table 16. *Scenarios 19–21:* Maximum (R_{max}) horizontal distances (in km) to frequency-weighted SEL_{24h} PTS and TTS thresholds based on NMFS (2018) and Finneran et al. (2017) from the most appropriate location for considered sources per scenario, and ensonified area (km²). A dash indicates the level was not reached within the limits of the modelling resolution (20 m). MODU: Mobile Offshore Drilling Unit, OSV: Offshore Supply Vessel.

Hearing group	**SEL_{24h} threshold** ($L_{E,24h}$; dB re 1 µPa²·s)†	**MODU Drilling, Platform and 4 h OSV resupply (Scenario 19)**		**MODU Drilling, Platform and 8 h OSV resupply (Scenario 20)**		**MODU Drilling, Platform and Skid Installation Vessel operating at 20% MCR (Scenario 21)**	
		R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)
PTS							
LF cetaceans	199	0.09	0.03	0.15	0.07	0.06	0.01
MF cetaceans	198	0.04	0.001	0.04	0.001	0.04	0.001
HF cetaceans	173	0.26	0.16	0.26	0.16	0.26	0.16
Phocid seals	201	0.04	0.004	0.05	0.008	0.04	0.001
Otariid seals	219	–	–	–	–	–	–
Turtles	220	–	–	0.03	0.001	0.03	0.001
TTS							
LF cetaceans	179	0.95	2.31	1.23	4.03	0.65	1.10
MF cetaceans	178	0.16	0.06	0.16	0.06	0.16	0.06
HF cetaceans	153	1.15	3.25	1.15	3.26	1.15	3.26
Phocid seals	181	0.28	0.24	0.41	0.46	0.18	0.09
Otariid seals	199	0.04	0.005	0.06	0.011	0.04	0.001
Turtles	200	0.08	0.02	0.15	0.04	0.08	0.02

Table 17. *Scenarios 23–26:* Maximum (R_{max}) horizontal distances (in km) to frequency-weighted SEL_{24h} PTS and TTS thresholds based on NMFS (2018) and Finneran et al. (2017) from the most appropriate location for considered sources per scenario, and ensonified area (km²). A dash indicates the level was not reached within the limits of the modelling resolution (20 m), PLV: Pipelay Vessel.

Hearing group	SEL_{24h} threshold ($L_{E,24h}$; dB re 1 µPa²·s)†	PLV stationary operating at 40% MCR, at Thylacine				PLV laying pipe operating at 40% MCR, at Thylacine			
		June (Scenario 23)		November (Scenario 24)		June (Scenario 25)		November (Scenario 26)	
		R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)
PTS									
LF cetaceans	199	0.09	0.03	0.09	0.03	0.03	0.39	0.03	0.39
MF cetaceans	198	0.02	0.001	0.02	0.001	0.01	0.11	0.01	0.11
HF cetaceans	173	0.16	0.08	0.16	0.08	0.07	0.79	0.07	0.78
Phocid seals	201	0.02	0.001	0.02	0.001	0.02	0.18	0.01	0.18
Otariid seals	219	–	–	–	–	–	–	–	–
Turtles	220	0.02	0.001	0.02	0.001	–	–	–	–
TTS									
LF cetaceans	179	0.95	2.28	0.94	2.23	1.95	24.2	1.95	24.1
MF cetaceans	178	0.10	0.03	0.10	0.03	0.04	0.48	0.04	0.47
HF cetaceans	153	1.17	3.44	0.94	2.47	1.75	21.8	2.08	27.0
Phocid seals	181	0.27	0.22	0.30	0.22	0.24	2.76	0.24	2.75
Otariid seals	199	0.03	0.003	0.03	0.003	0.02	0.18	0.02	0.18
Turtles	200	0.11	0.038	0.11	0.04	0.05	0.57	0.05	0.57

Table 18. *Scenarios 27–30:* Maximum (R_{max}) horizontal distances (in km) to frequency-weighted SEL_{24h} PTS and TTS thresholds based on NMFS (2018) and Finneran et al. (2017) from the most appropriate location for considered sources per scenario, and ensonified area (km²). A dash indicates the level was not reached within the limits of the modelling resolution (20 m), PLV: Pipelay Vessel.

Hearing group	SEL_{24h} threshold ($L_{E,24h}$; dB re 1 µPa²·s)†	PLV stationary operating at 40% MCR, at Artisan				PLV laying pipe operating at 40% MCR, at Artisan			
		June (Scenario 27)		November (Scenario 28)		June (Scenario 29)		November (Scenario 30)	
		R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)
PTS									
LF cetaceans	199	0.09	0.03	0.09	0.03	0.04	0.39	0.03	0.39
MF cetaceans	198	0.01	0.001	0.01	0.001	0.01	0.02	0.01	0.01
HF cetaceans	173	0.14	0.06	0.14	0.06	0.07	0.75	0.06	0.74
Phocid seals	201	0.02	0.001	0.02	0.001	0.02	0.25	0.02	0.25
Otariid seals	219	–	–	–	–	–	–	–	–
Turtles	220	–	–	–	–	–	–	–	–
TTS									
LF cetaceans	179	0.88	2.02	0.88	1.99	1.40	17.1	1.39	17.0
MF cetaceans	178	0.10	0.03	0.11	0.04	0.04	0.49	0.04	0.48
HF cetaceans	153	0.94	2.75	0.81	1.93	1.27	16.5	1.53	18.3
Phocid seals	181	0.25	0.19	0.24	0.18	0.21	2.44	0.21	2.43
Otariid seals	199	0.03	0.002	0.03	0.002	0.02	0.25	0.02	0.25
Turtles	200	0.14	0.06	0.14	0.06	0.05	0.59	0.05	0.59

Table 19. *Scenarios 31–34:* Maximum (R_{max}) horizontal distances (in km) to frequency-weighted SEL_{24h} PTS and TTS thresholds based on NMFS (2018) and Finneran et al. (2017) from the most appropriate location for considered sources per scenario, and ensonified area (km²). A dash indicates the level was not reached within the limits of the modelling resolution (20 m), PLV: Pipelay Vessel, ROV: Remotely Operated Vehicle.

Hearing group	SEL_{24h} threshold ($L_{E,24h}$; dB re 1 μPa²·s)†	PLV stationary operating at 40% MCR, at Thylacine and ROV Operations at Geographe-4				PLV stationary operating at 40% MCR, at Artisan and ROV Operations at Geographe-4				MODU Drilling, Platform and Skid Installation Vessel operating at 40% MCR (Scenario 35)	
		June (Scenario 31)		November (Scenario 32)		June (Scenario 33)		November (Scenario 34)			
		R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)
PTS											
LF cetaceans	199	0.10	0.03	0.09	0.03	0.10	0.03	0.09	0.03	0.09	0.03
MF cetaceans	198	0.02	0.001	0.02	0.001	0.02	0.001	0.02	0.001	0.04	0.001
HF cetaceans	173	0.16	0.08	0.16	0.08	0.15	0.08	0.15	0.08	0.26	0.16
Phocid seals	201	0.02	0.002	0.02	0.002	0.02	0.002	0.02	0.002	0.04	0.001
Otariid seals	219	–	–	–	–	–	–	–	–	–	–
Turtles	220	0.02	0.001	0.02	0.001	–	–	–	–	0.03	0.001
TTS											
LF cetaceans	179	0.95	2.39	0.94	2.38	0.91	2.39	0.91	2.38	0.85	2.10
MF cetaceans	178	0.13	0.05	0.13	0.05	0.13	0.05	0.13	0.05	0.16	0.06
HF cetaceans	153	1.17	3.55	0.99	3.08	1.06	3.55	0.99	3.08	1.15	3.28
Phocid seals	181	0.27	0.22	0.27	0.22	0.25	0.19	0.25	0.19	0.22	0.15
Otariid seals	199	0.03	0.003	0.03	0.003	0.03	0.003	0.03	0.003	0.04	0.003
Turtles	200	0.15	0.05	0.15	0.05	0.15	0.06	0.15	0.06	0.10	0.04

4.2. Sound Field Maps

4.2.1. SPL Maps

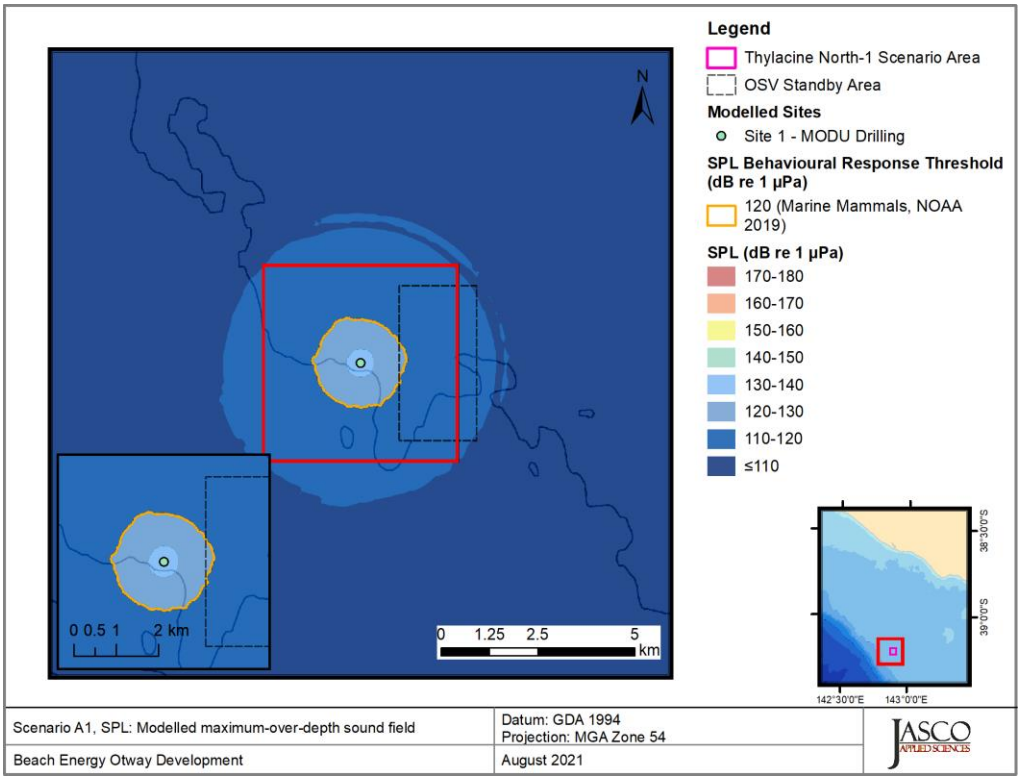

Figure 4. *Thylacine North-1, MODU Drilling (Scenario A1) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

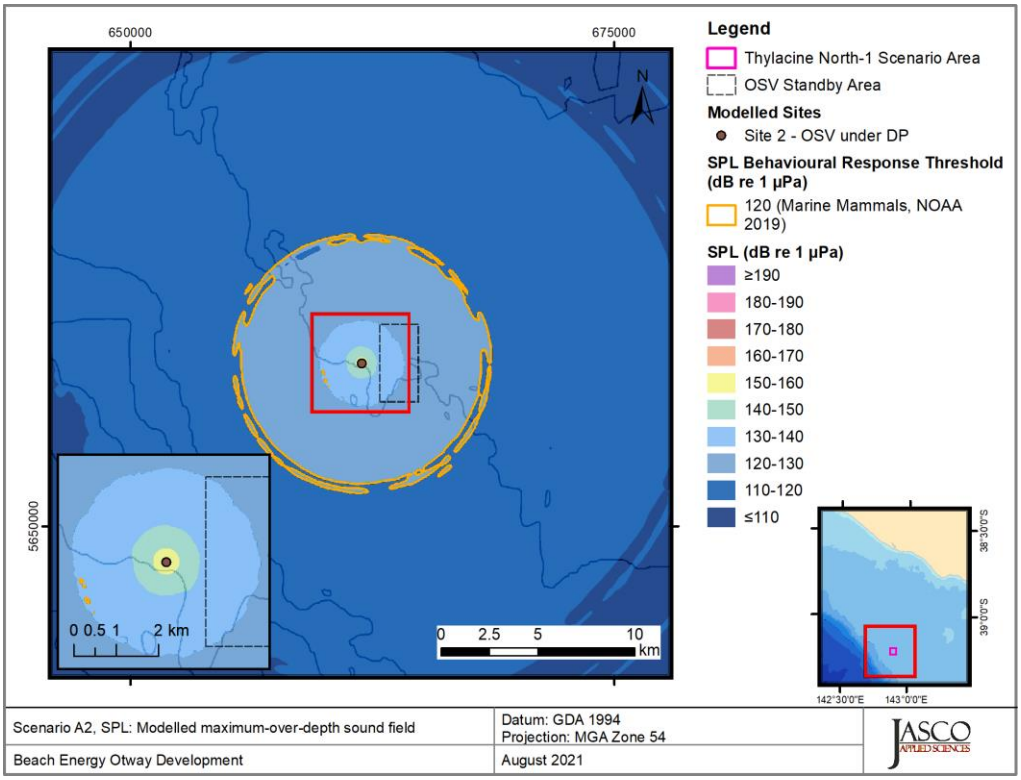

Figure 5. *Thylacine North-1, OSV on DP (Scenario A2) :* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

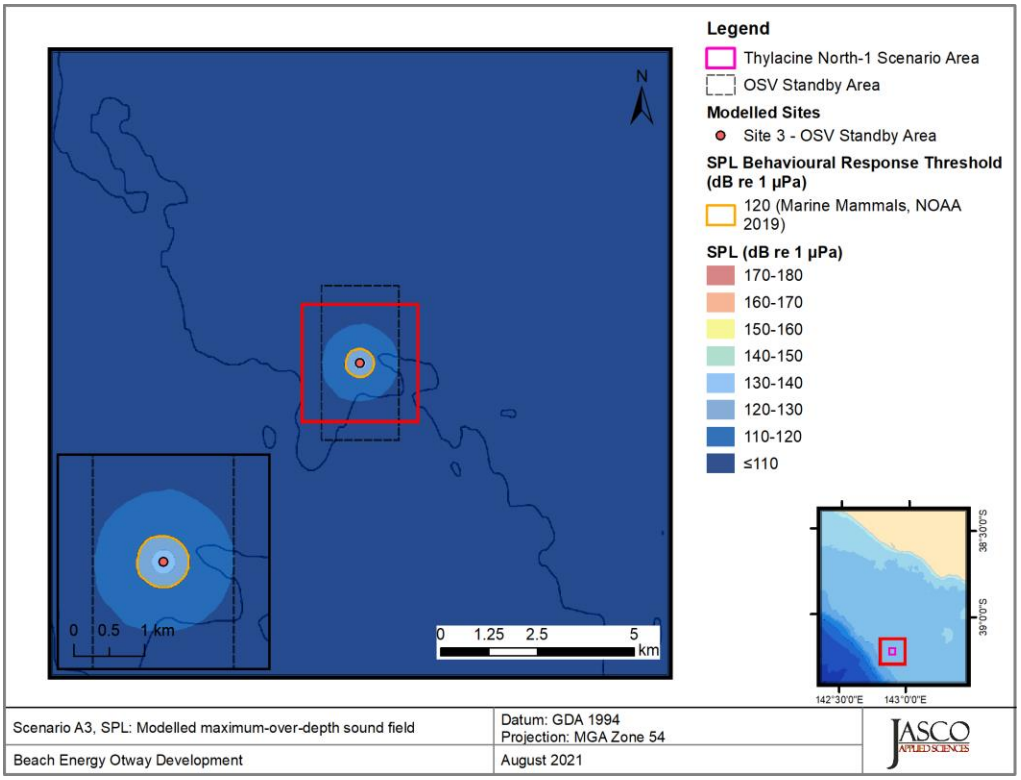

Figure 6. *Thylacine North-1, OSV Standby (Scenario A3) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

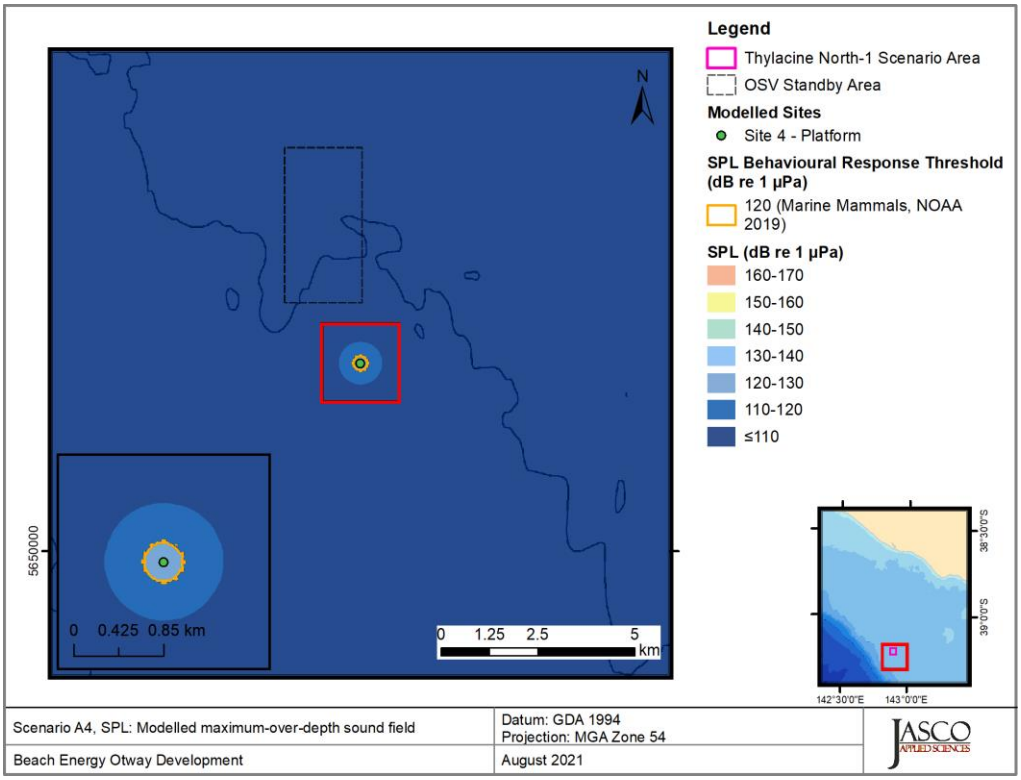

Figure 7. *Thylacine A, Platform Operations (Scenario A4) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

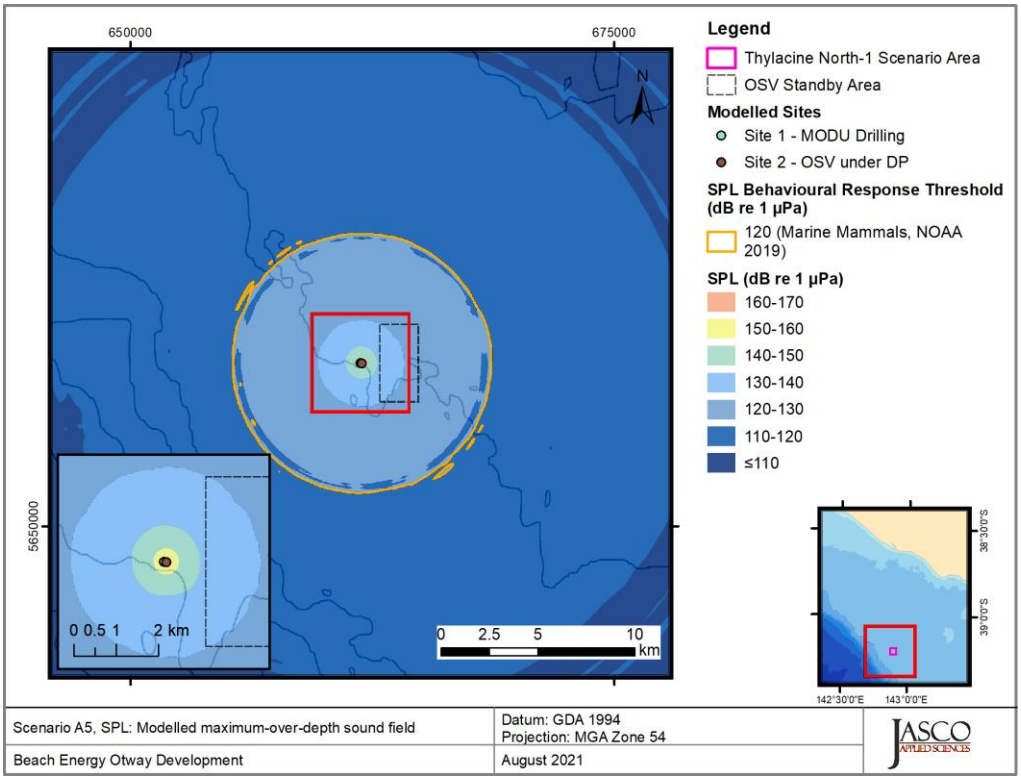

Figure 8. *Thylacine North-1, MODU Drilling and OSV Resupply (Scenario A5) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

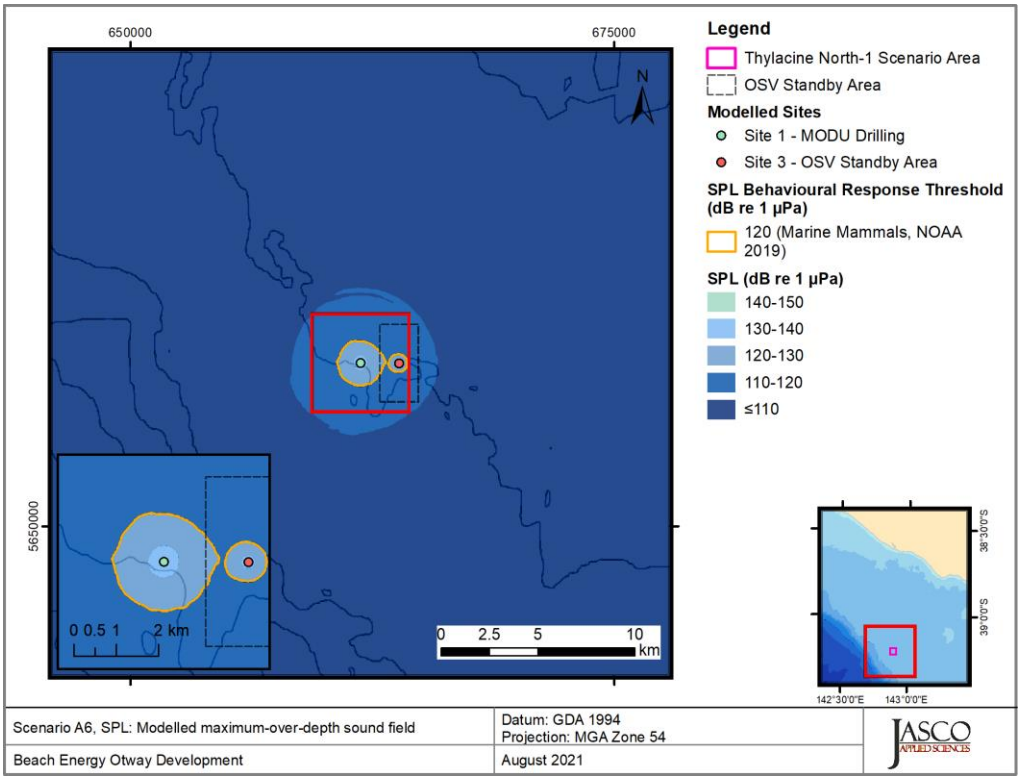

Figure 9. *Thylacine North-1, MODU Drilling and OSV Standby (Scenario A7) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

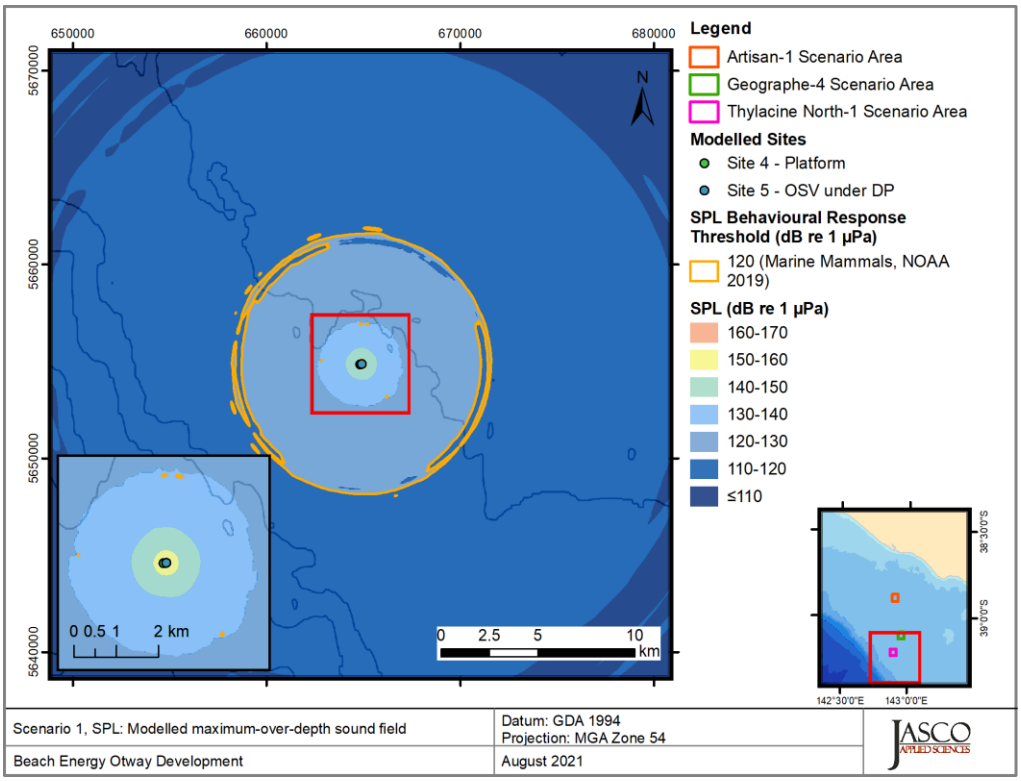

Figure 10. *Thylacine A Platform, Platform Resupply (Scenario 1) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

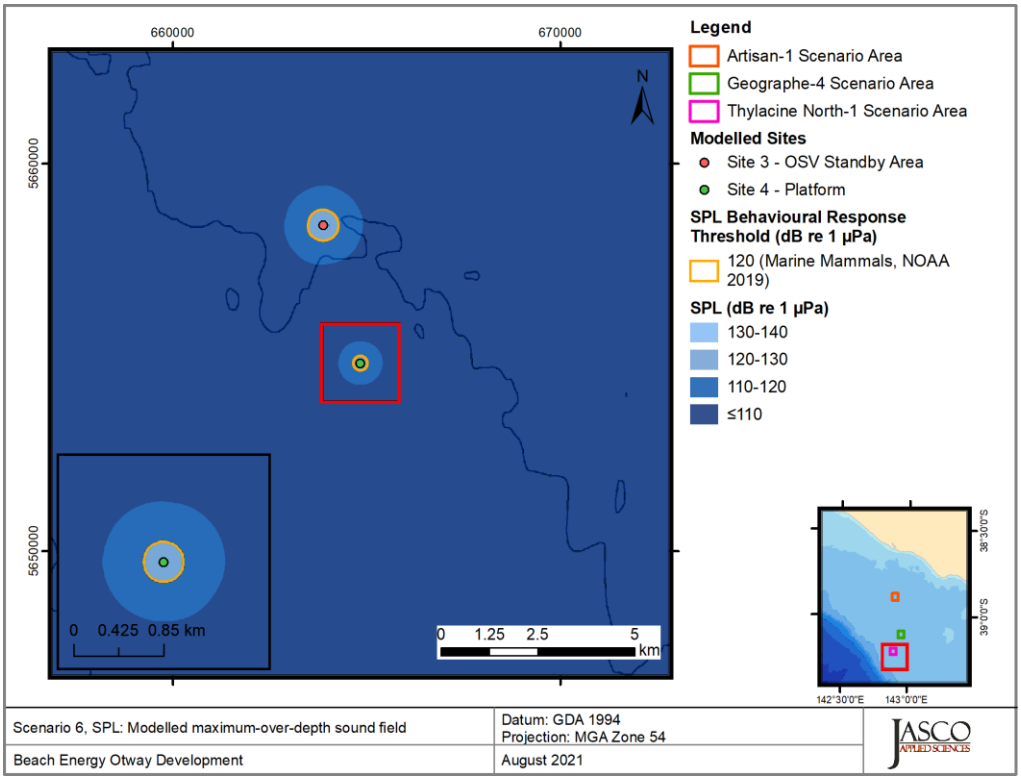

Figure 11. *Thylacine A Platform, OSV standby (Scenario 6) SPL :* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

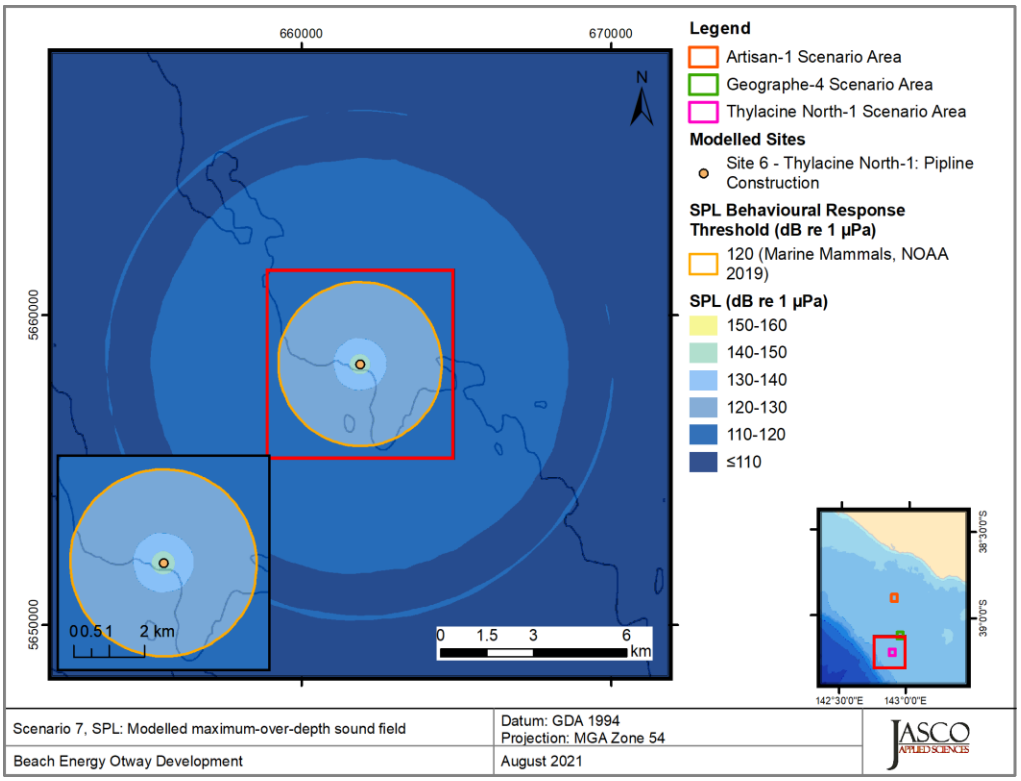

Figure 12. *Thylacine North-1, PLV stationary 20% MCR -June (Scenario 7) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

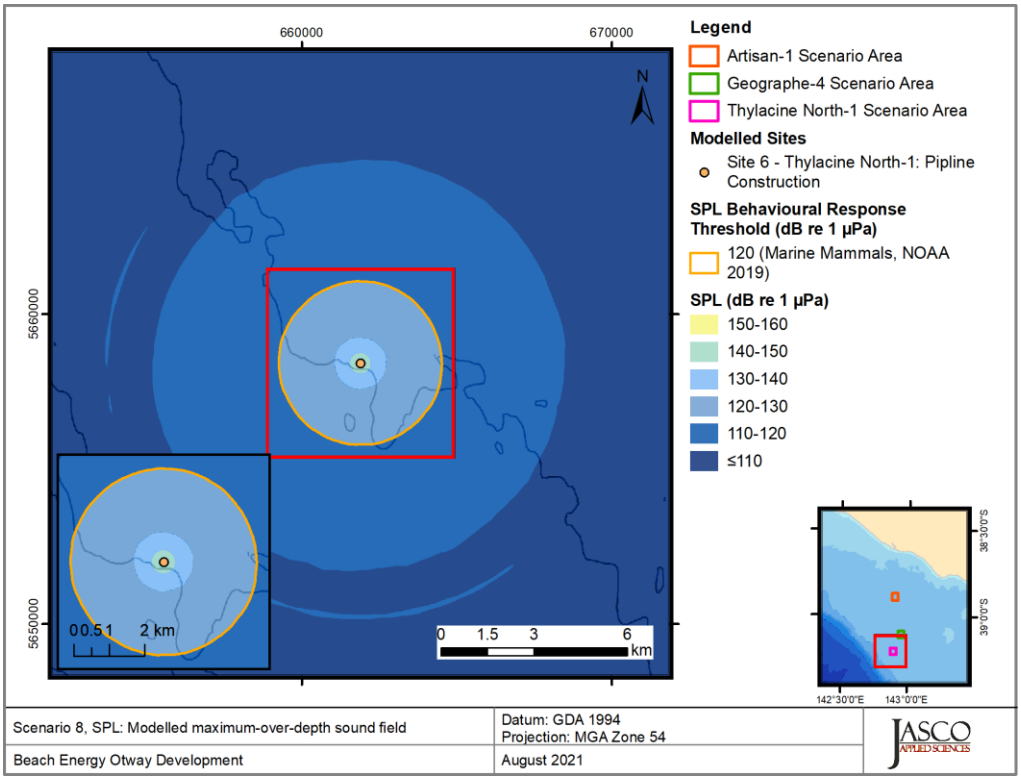

Figure 13. *Thylacine North-1, PLV stationary 20% MCR -November (Scenario 8) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

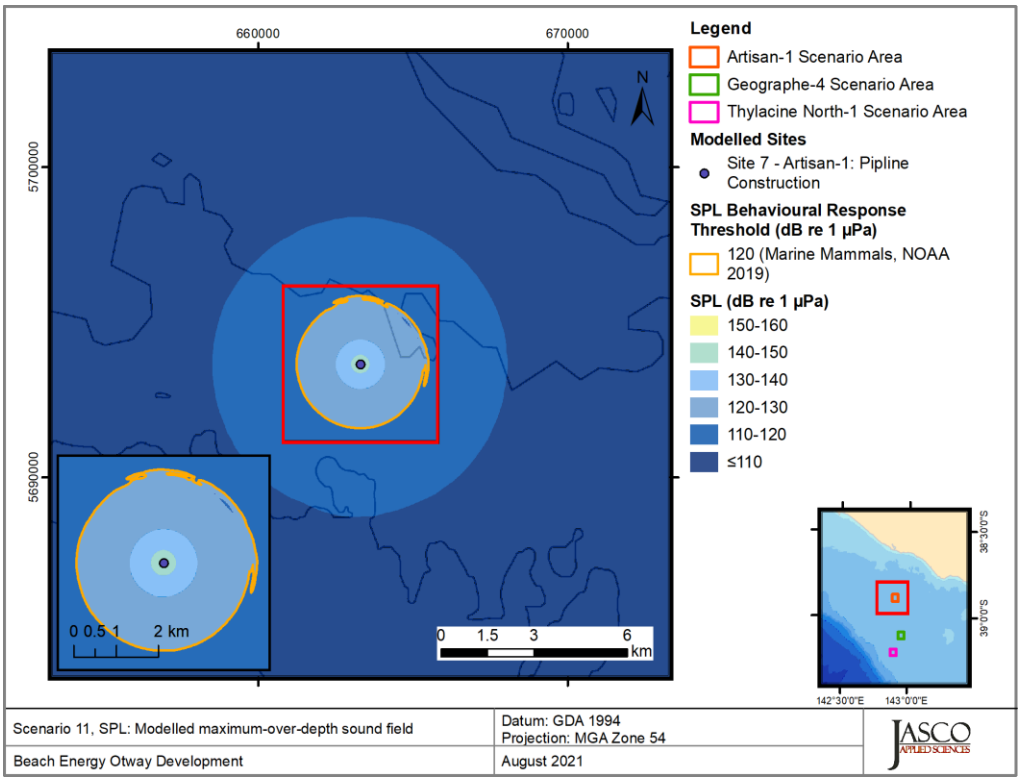

Figure 14. *Artisan-1, PLV stationary 20% MCR -June (Scenario 11) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

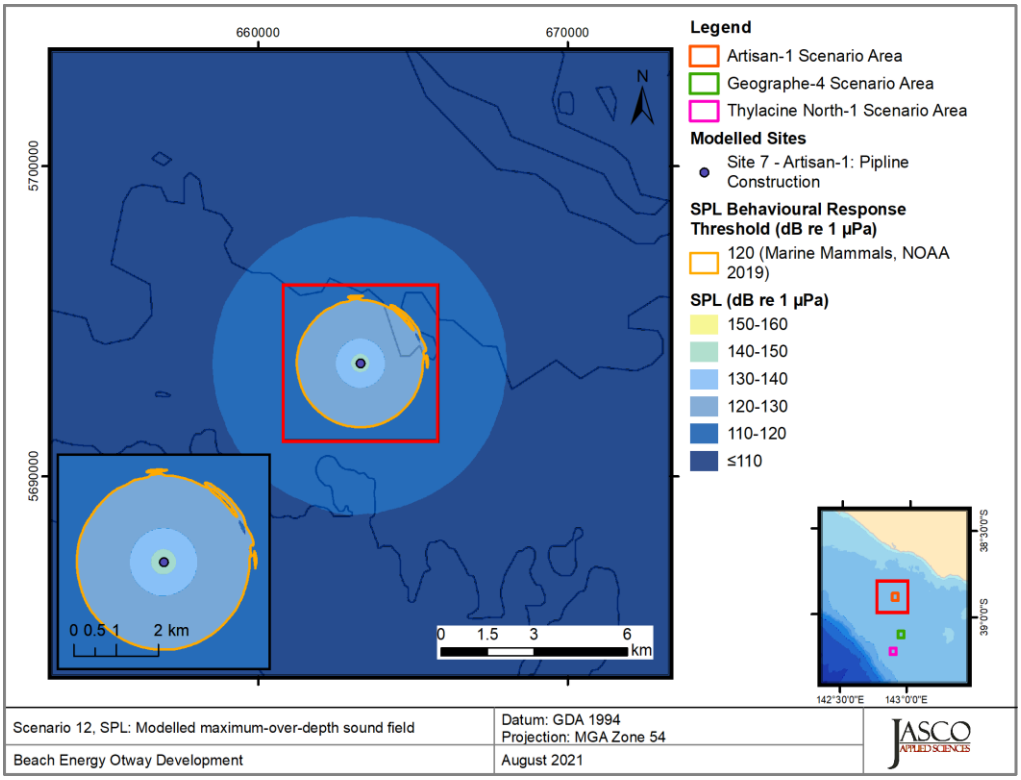

Figure 15. *Artisan-1, PLV stationary 20% MCR - November (Scenario 12) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

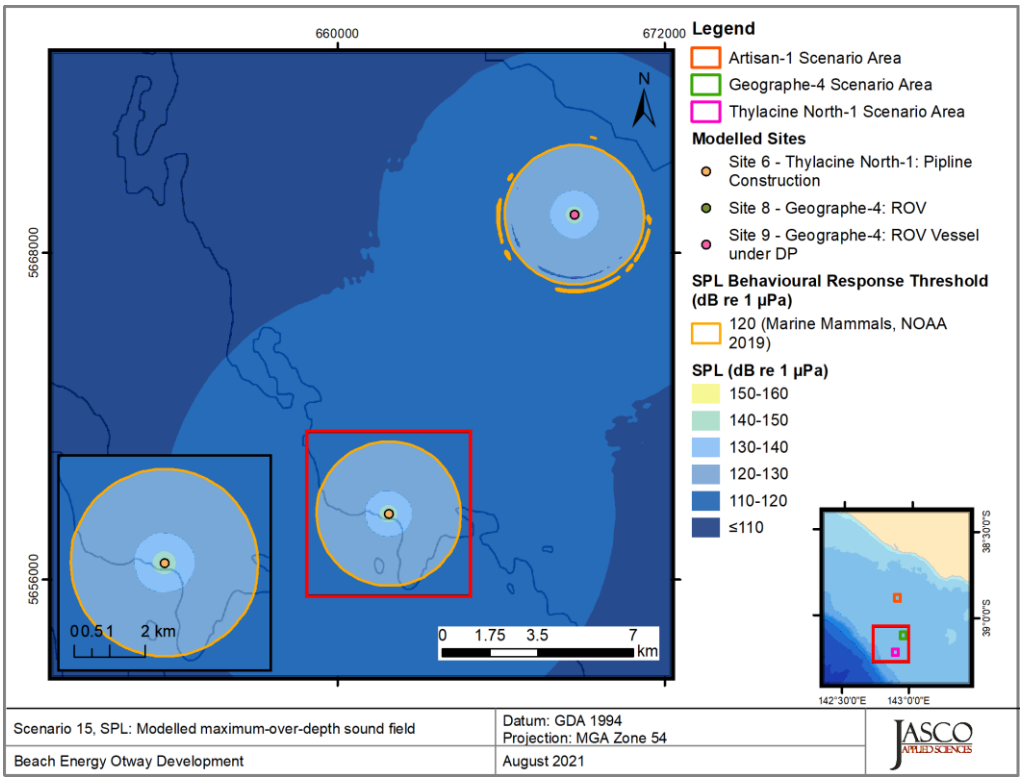

Figure 16. *Thylacine North-1, PLV stationary and ROV operations at Geographe-4 (20% MCR) - June (Scenario 15) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is s hown as an orange contour line.

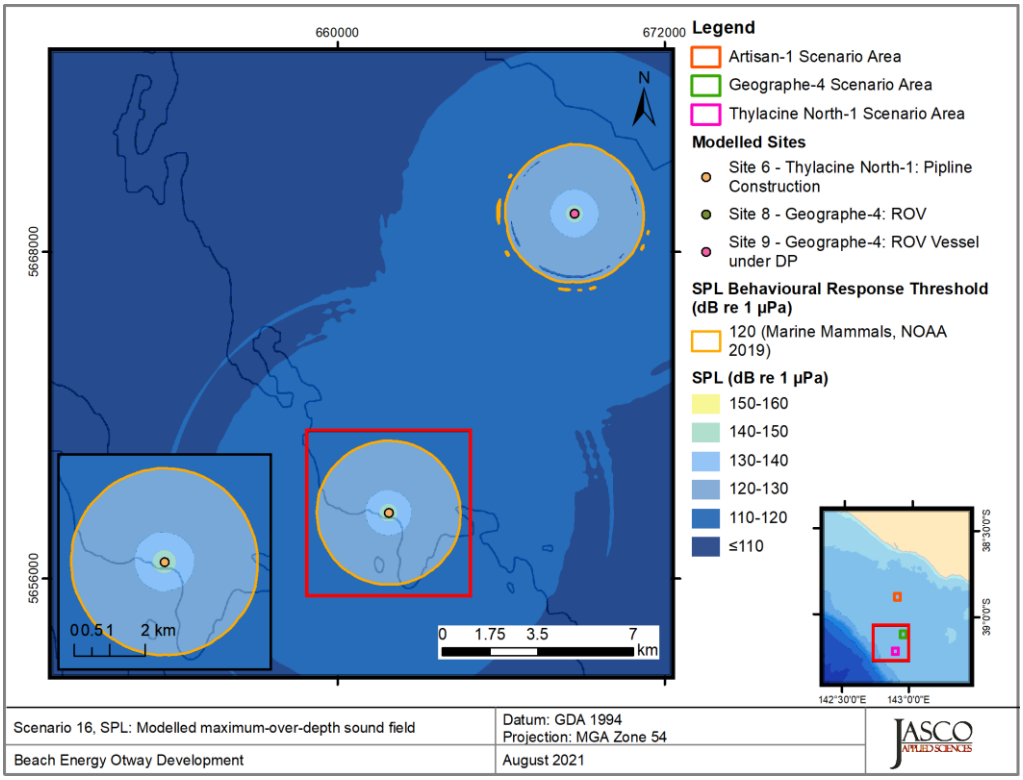

Figure 17. *Thylacine North-1, PLV stationary and ROV operations at Geographe-4 (20% MCR) – November (Scenario 16) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

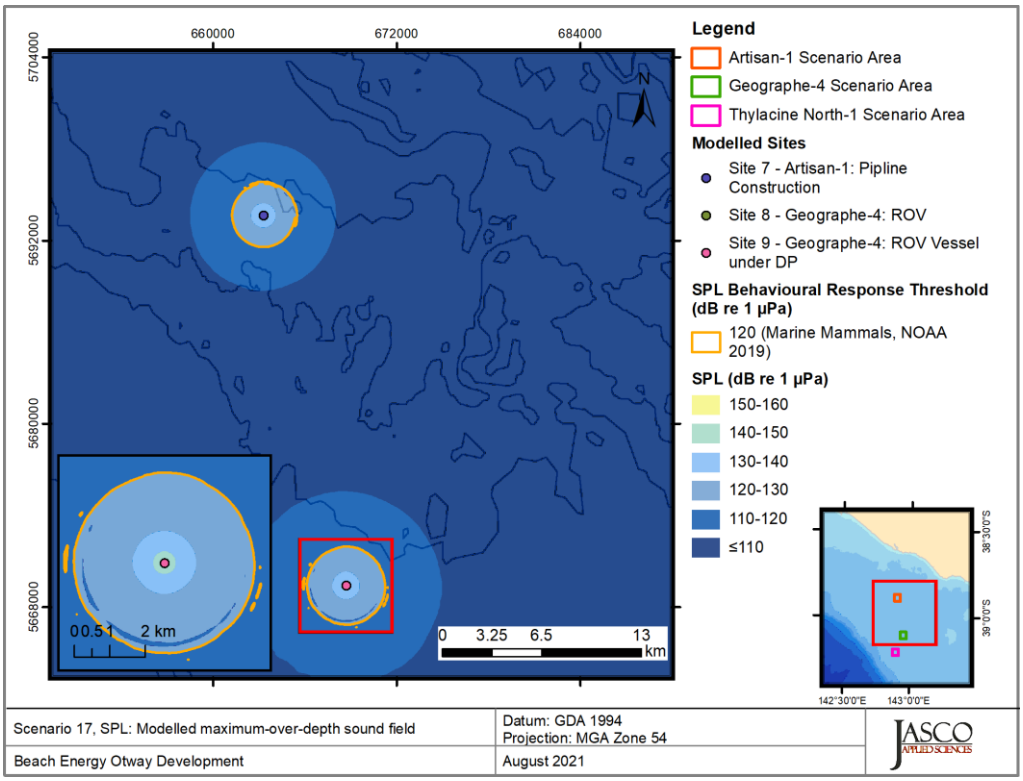

Figure 18. *Artisan-1, PLV stationary and ROV Operations at Geographe-4 (20% MCR) – June (Scenario 17) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

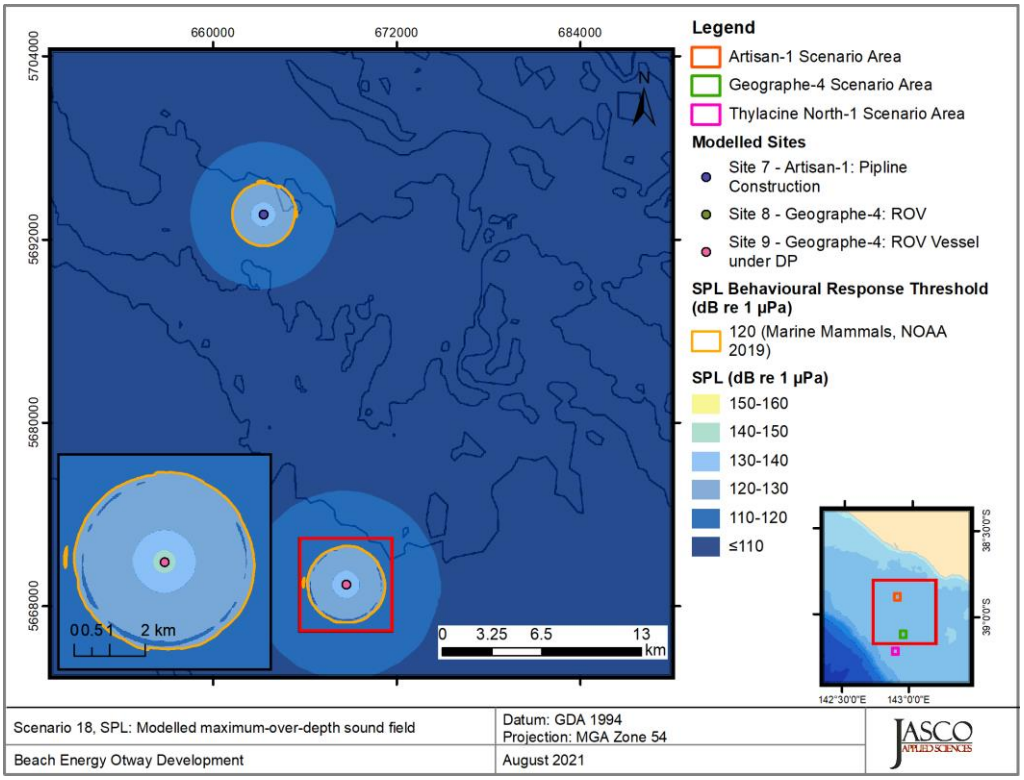

Figure 19. *Artisan-1, PLV stationary and ROV Operations at Geographe-4 (20% MCR) – November (Scenario 18) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

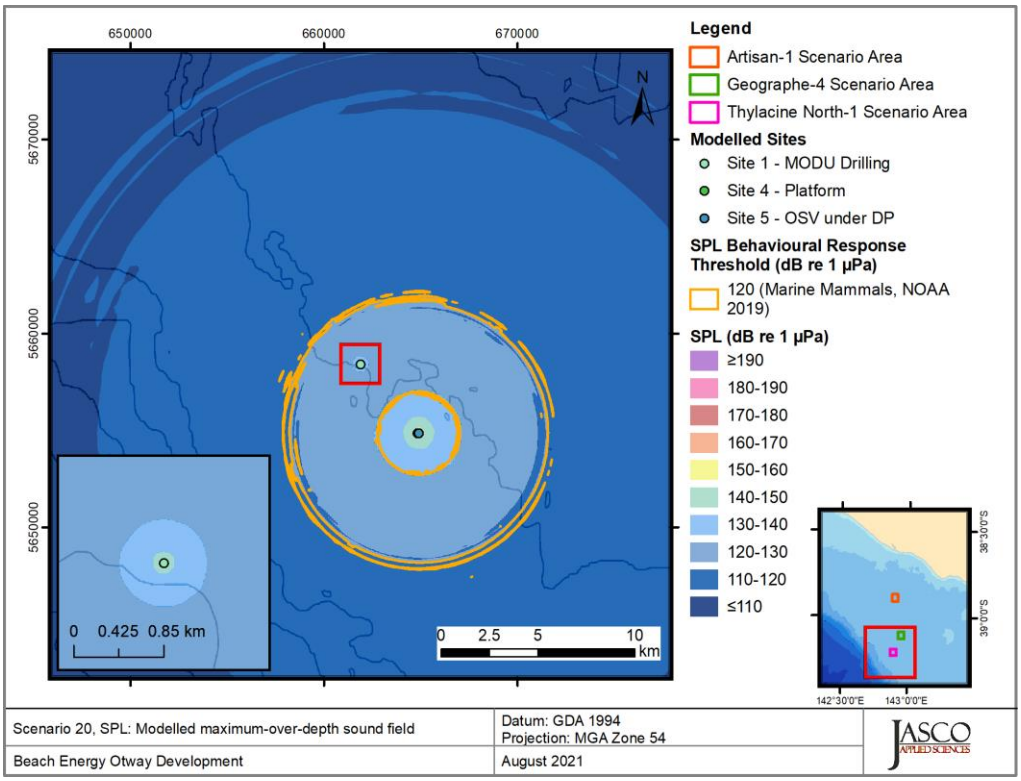

Figure 20. *Thylacine A Platform, Platform Resupply and MODU Drilling (Scenario 20) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

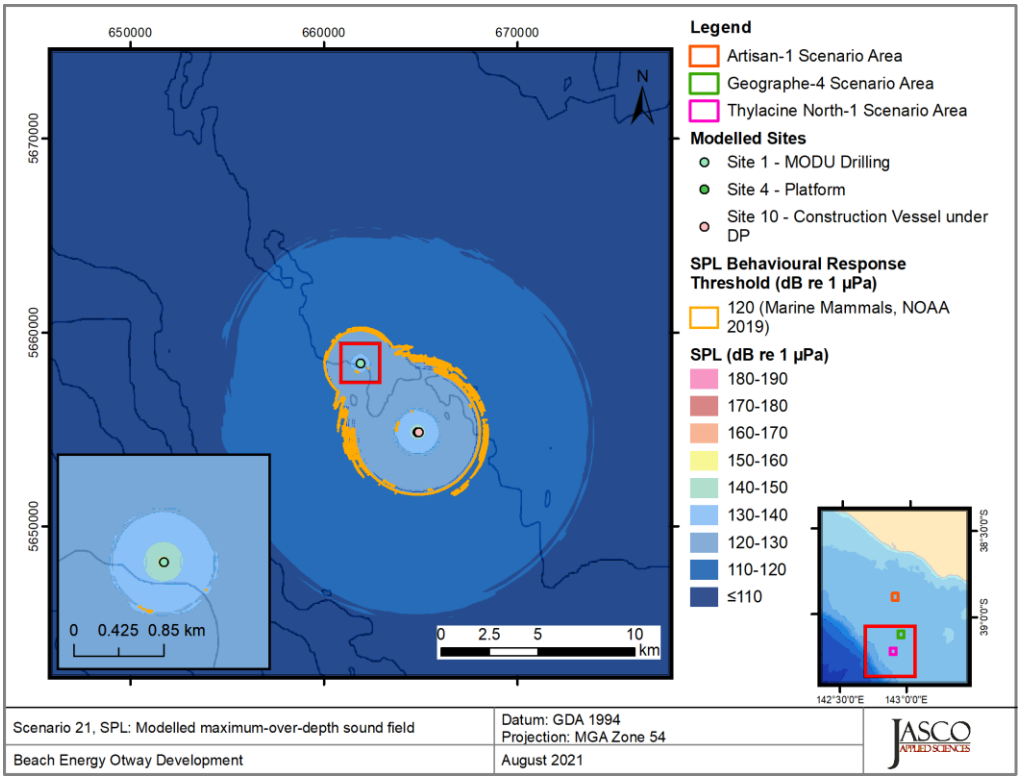

Figure 21. *Thylacine A Platform, Platform operations and skid installation* at 20% MCR *(Scenario 21) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

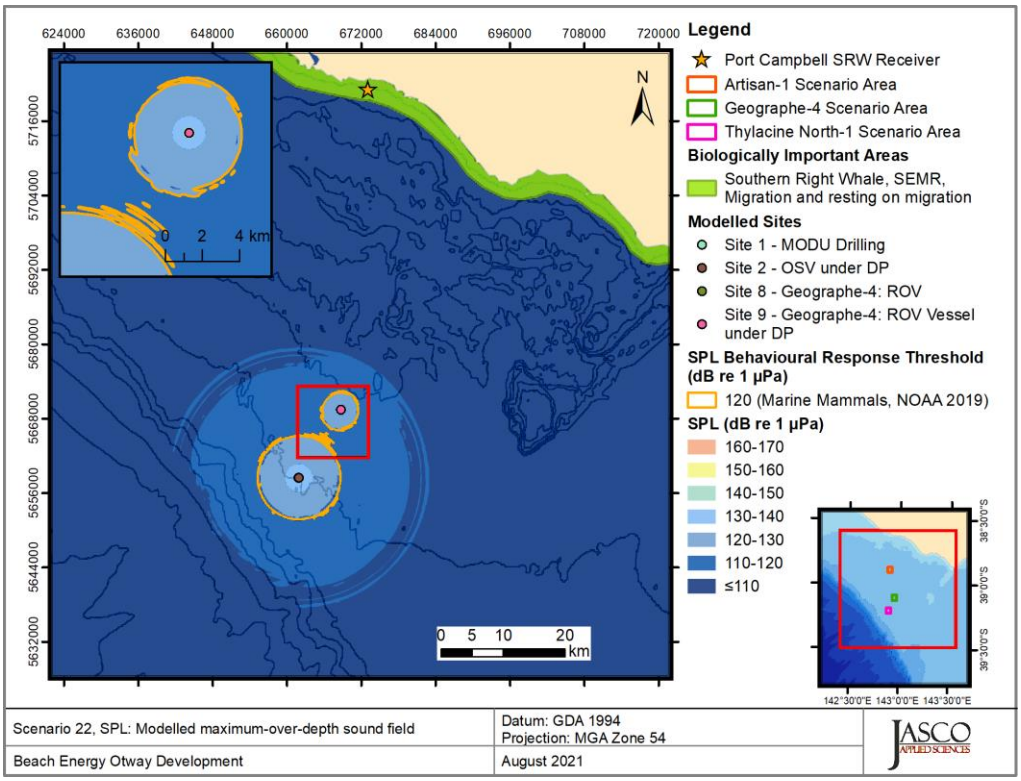

Figure 22. *Concurrent drilling operations at Thylacine North-1 and construction operations (20% MCR) at Geographe-4 (Scenario 22) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

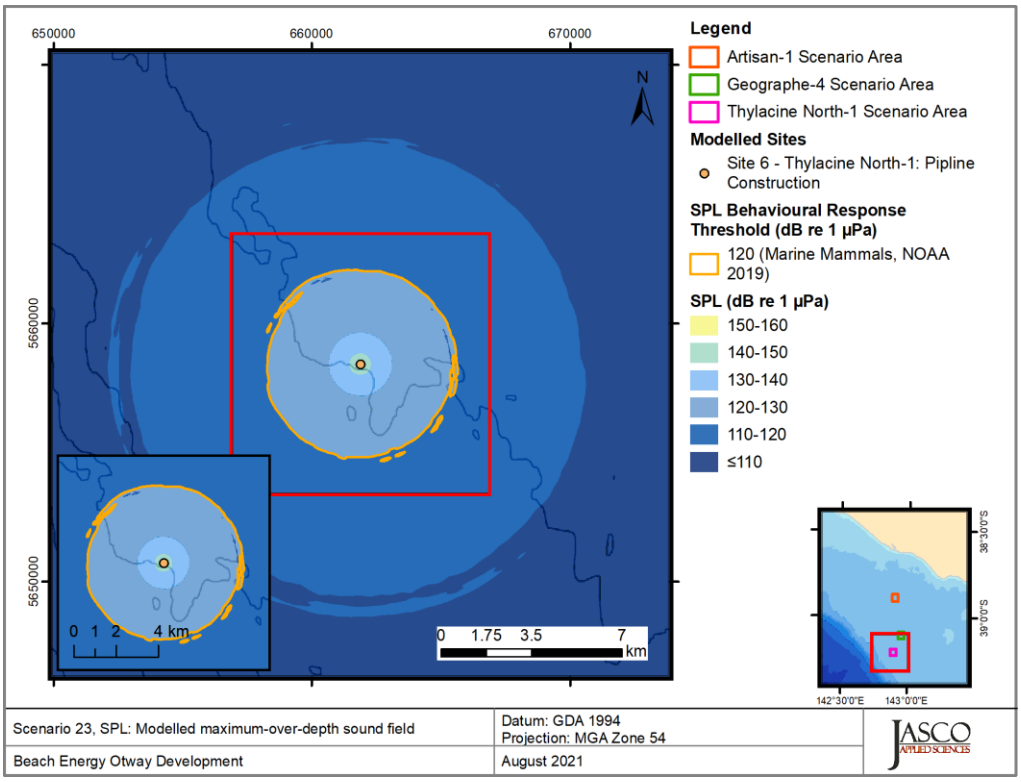

Figure 23. *Thylacine North-1, PLV stationary 40% MCR -June (Scenario 23) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

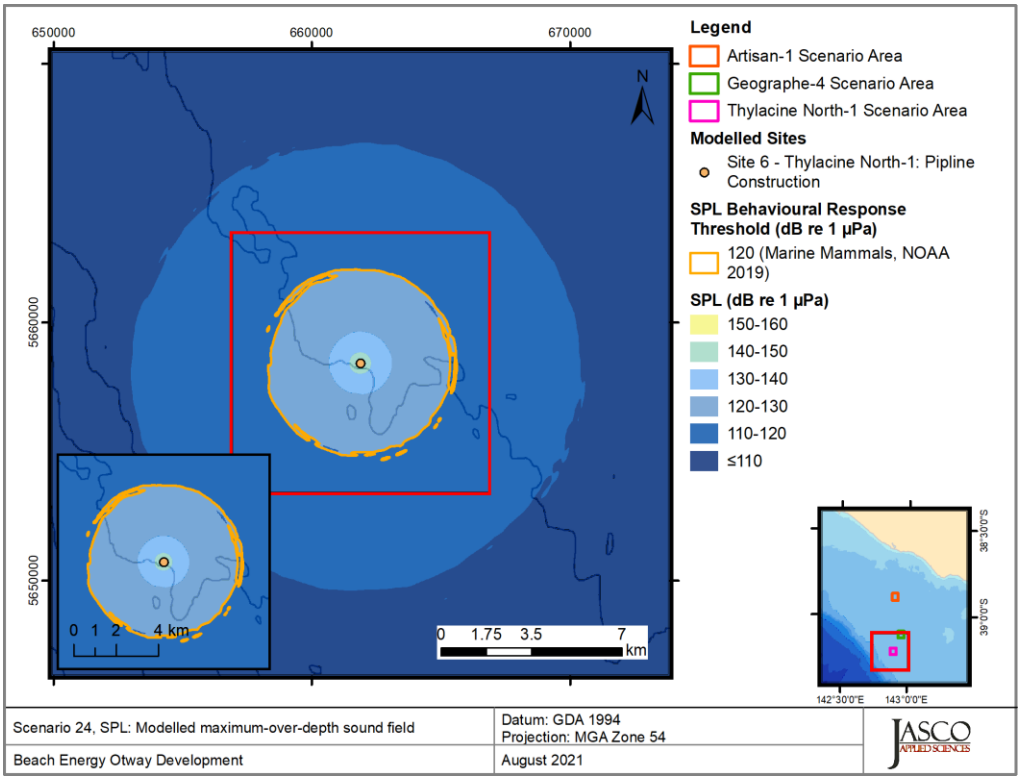

Figure 24. *Thylacine North-1, PLV stationary 40% MCR -November (Scenario 24) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

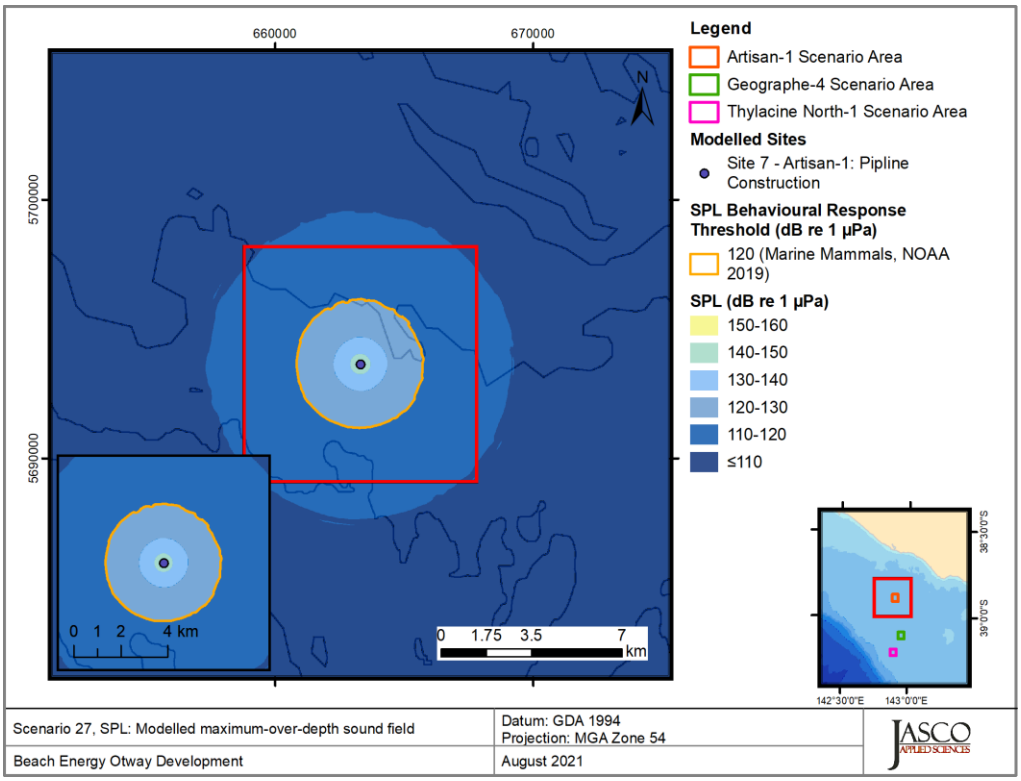

Figure 25. *Artisan-1, PLV stationary 40% MCR -June (Scenario 27) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

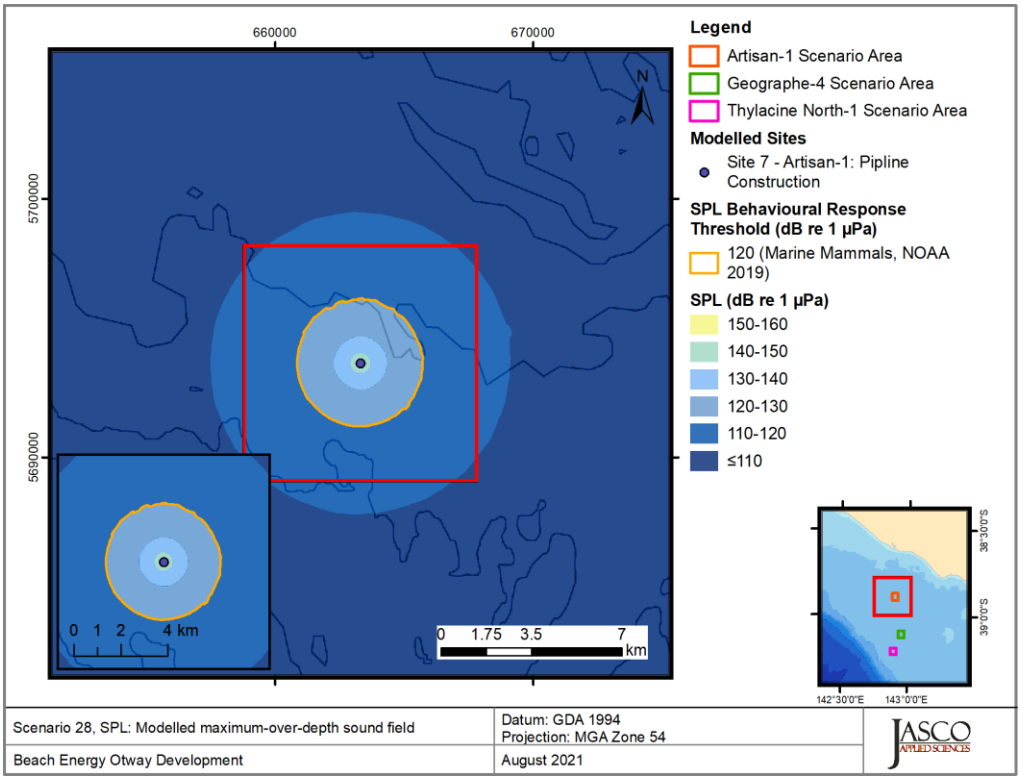

Figure 26. *Artisan-1, PLV stationary 40% MCR -November (Scenario 28) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

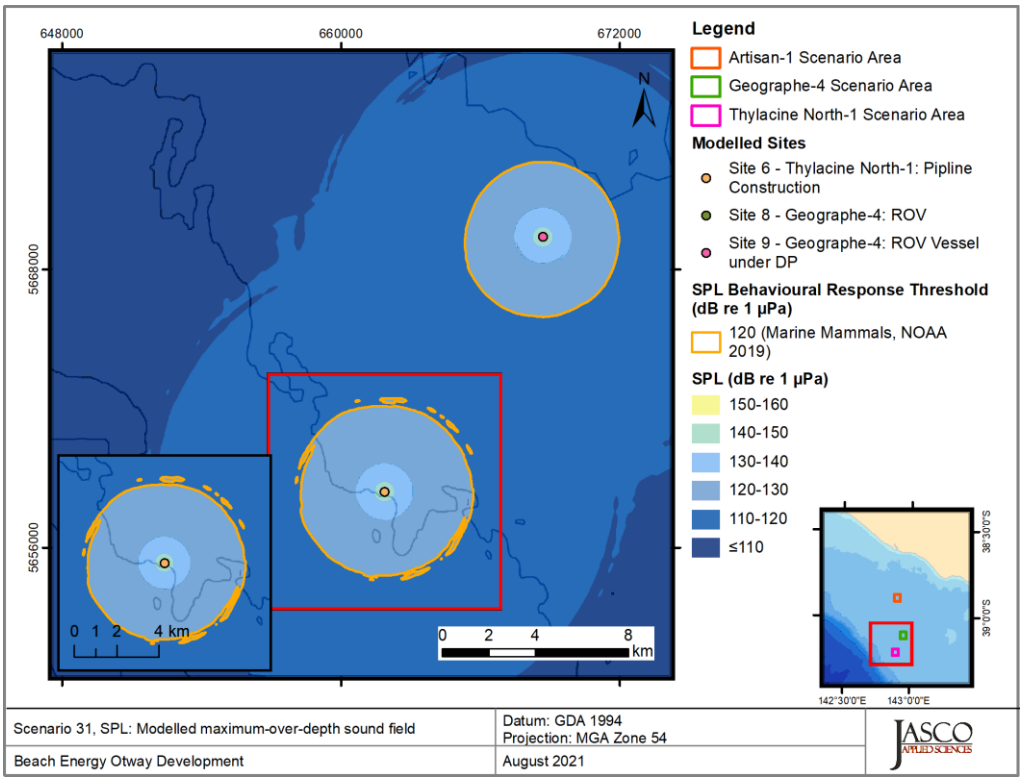

Figure 27. *Thylacine North-1, PLV stationary 40% MCR and ROV operations at Geographe-4 - June (Scenario 31) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

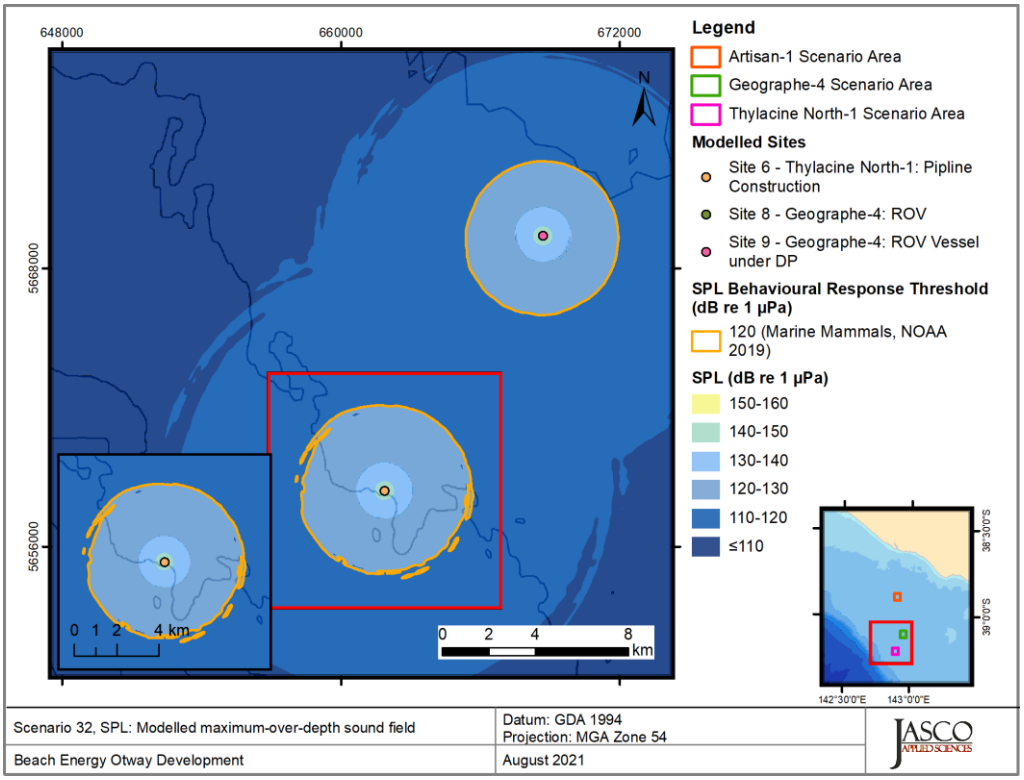

Figure 28. *Thylacine North-1, PLV stationary 40% MCR and ROV operations at Geographe-4 – November (Scenario 32) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

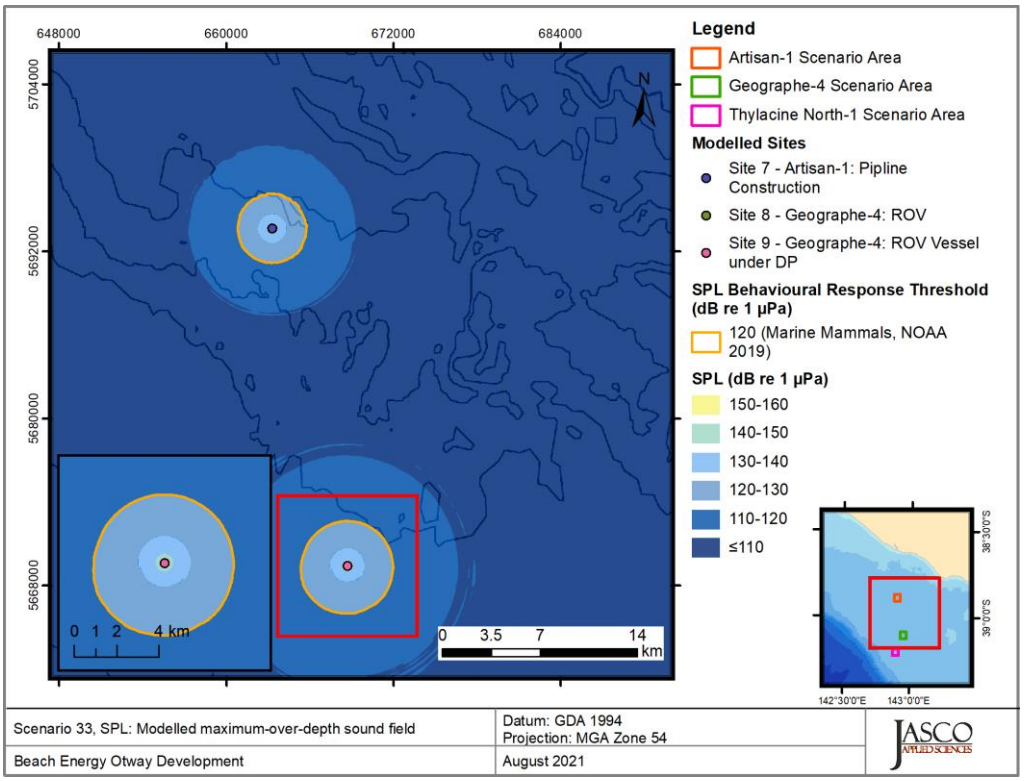

Figure 29. *Artisan-1, PLV stationary 40% MCR and ROV Operations at Geographe-4 – June (Scenario 33) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

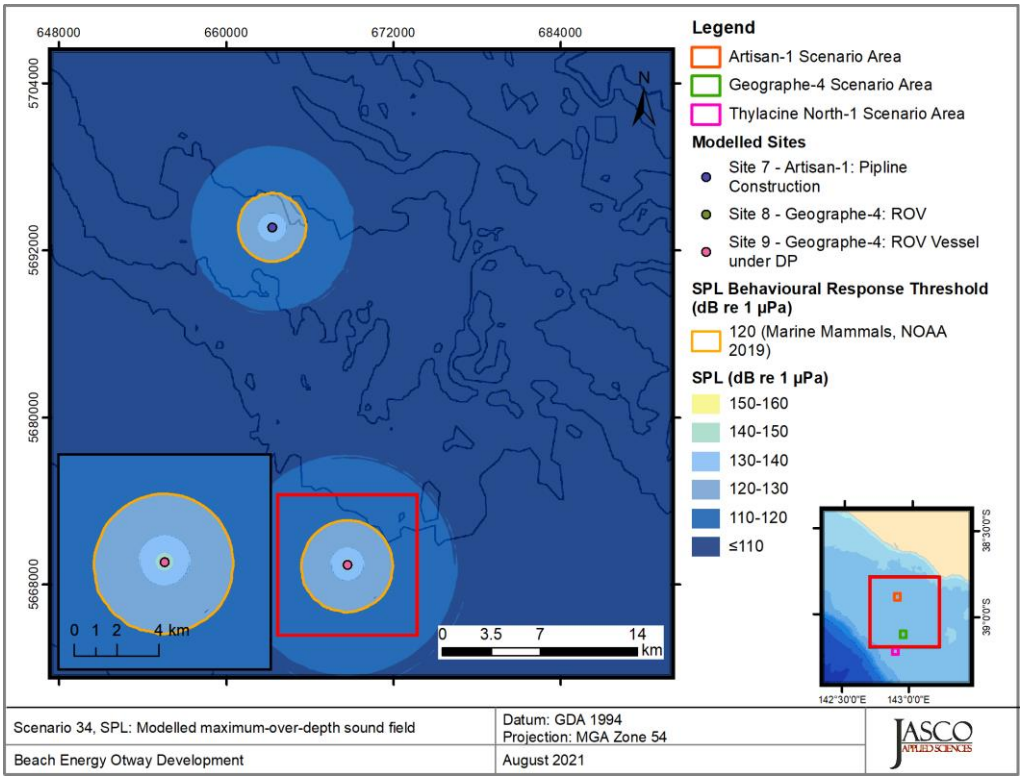

Figure 30. *Artisan-1, PLV stationary 40% MCR and ROV Operations at Geographe-4 – November (Scenario 34) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

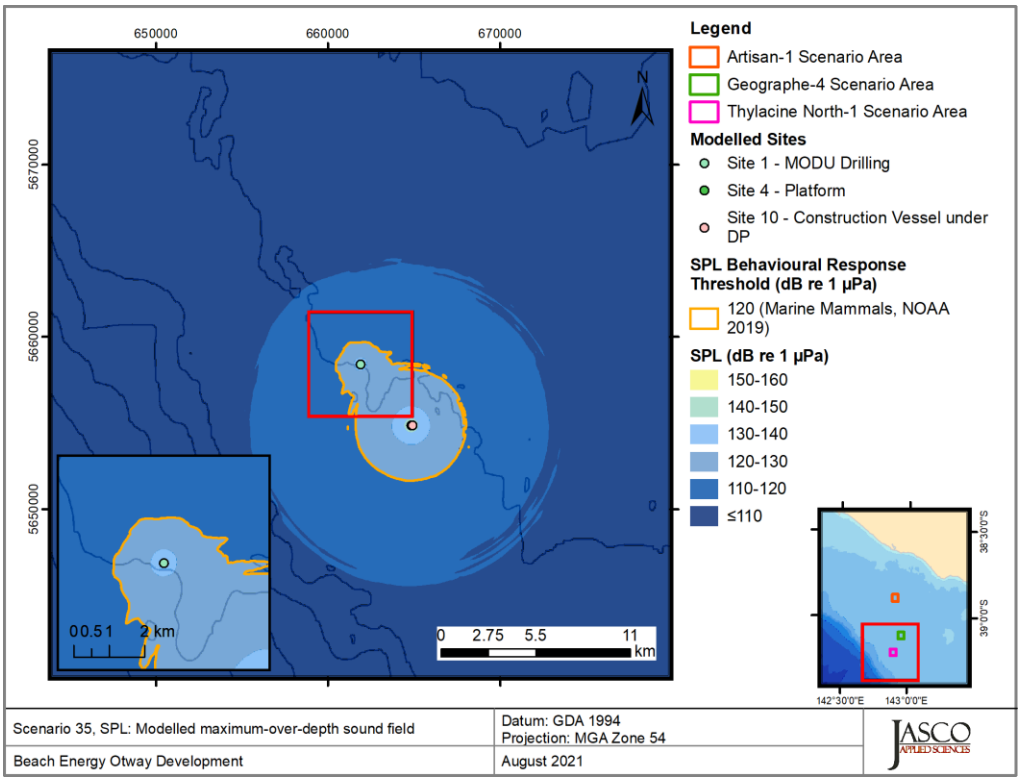

Figure 31. *Thylacine A Platform, Platform operations and skid installation at 40% MCR (Scenario 35) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

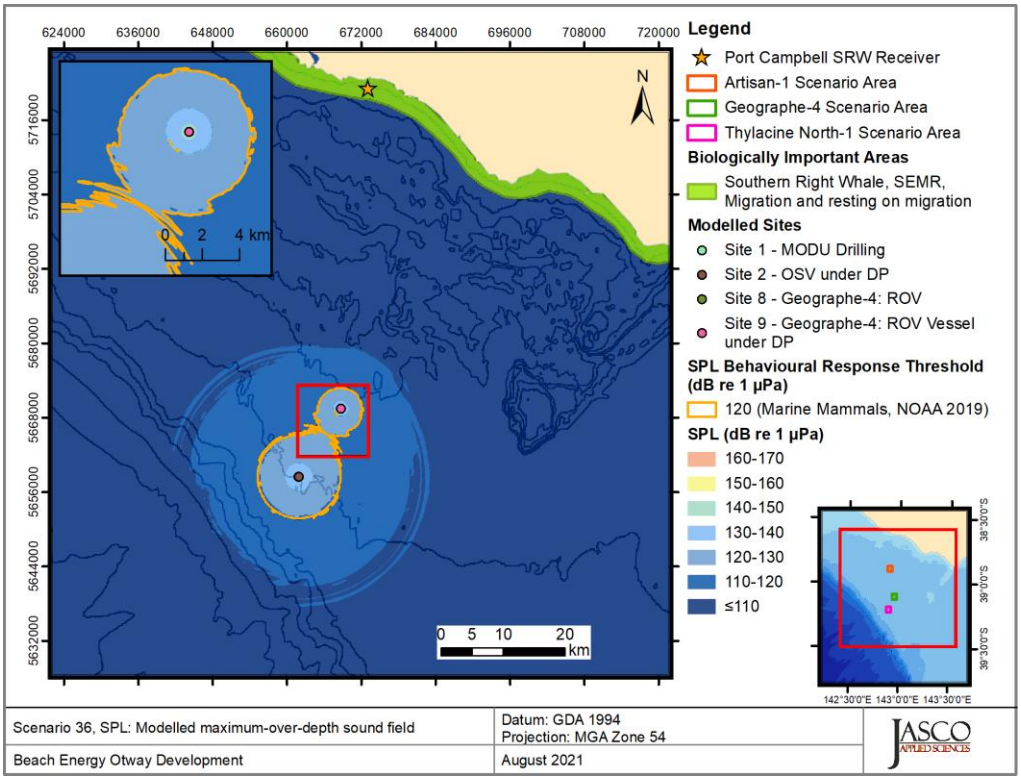

Figure 32. *Concurrent drilling operations at Thylacine North-1 and construction operations (40% MCR) at Geographe-4 (Scenario 36) SPL:* Sound level contour map, showing unweighted maximum over-depth SPL results. Isopleth for marine mammal (120 dB re 1 µPa) behavioural criteria is shown as an orange contour line.

4.2.2. Accumulated SEL_{24h} Maps

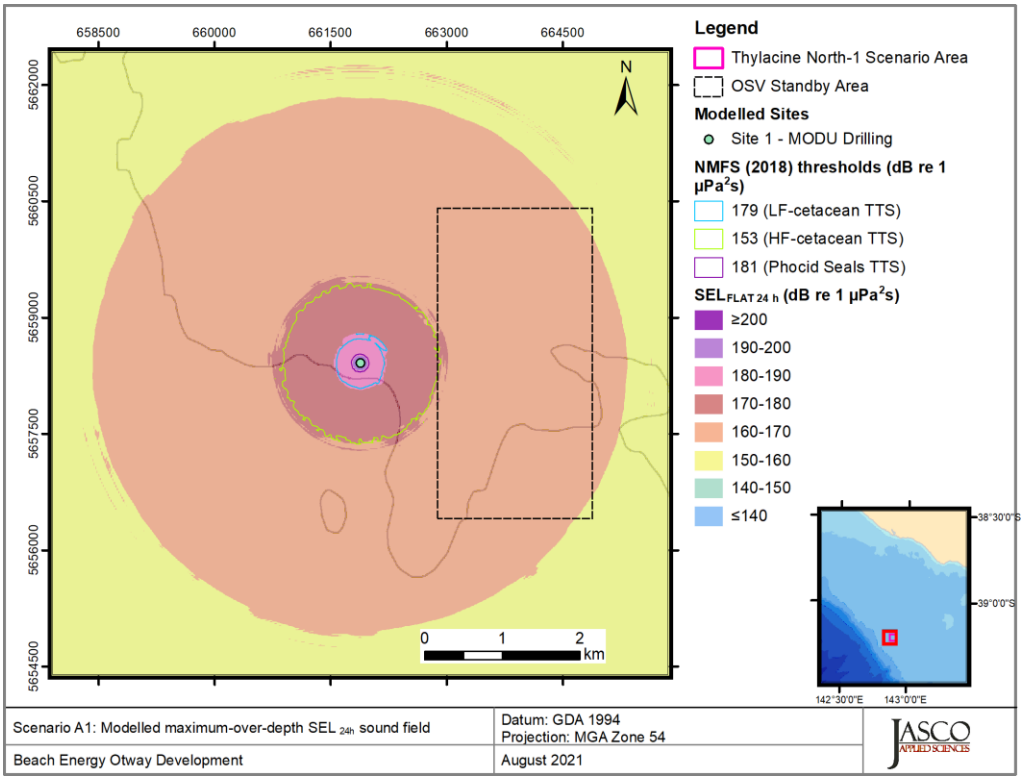

Figure 33. *Thylacine North-1, MODU Drilling (Scenario A1) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

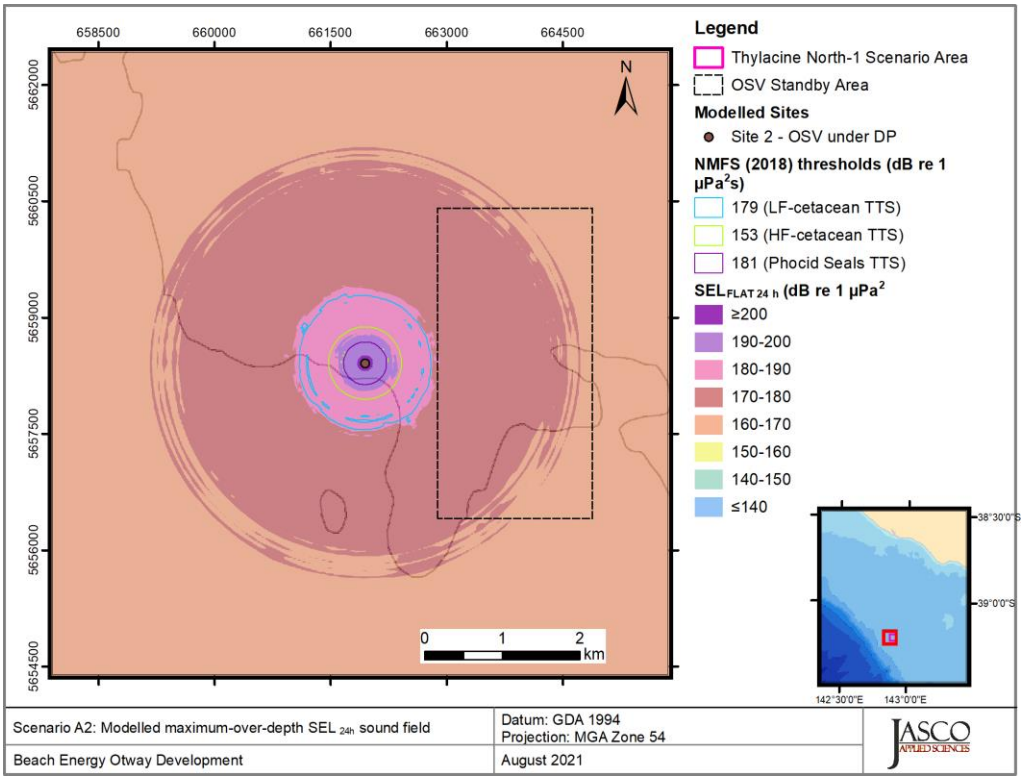

Figure 34. *Thylacine North-1, OSV on DP (4h) (Scenario A2) SEL$_{24h}$:* Sound level contour map showing unweighted maximum-over-depth SEL$_{24h}$ results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

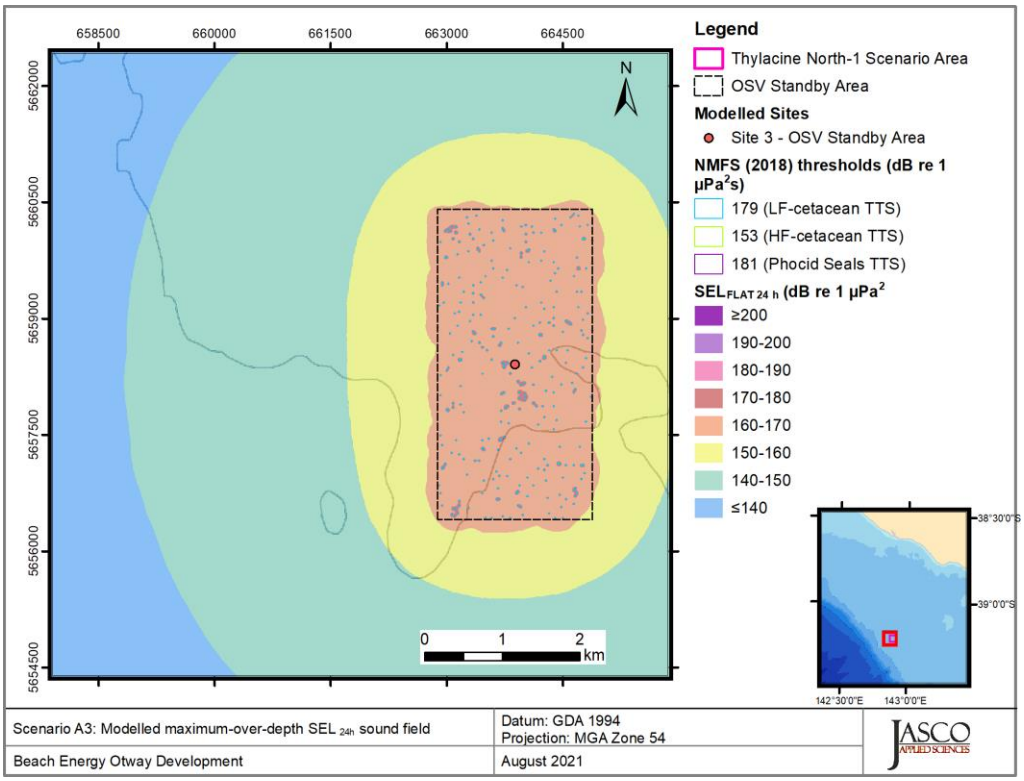

Figure 35. *Thylacine North-1, OSV Standby (Scenario A3) SEL$_{24h}$:* Sound level contour map showing unweighted maximum-over-depth SEL$_{24h}$ results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

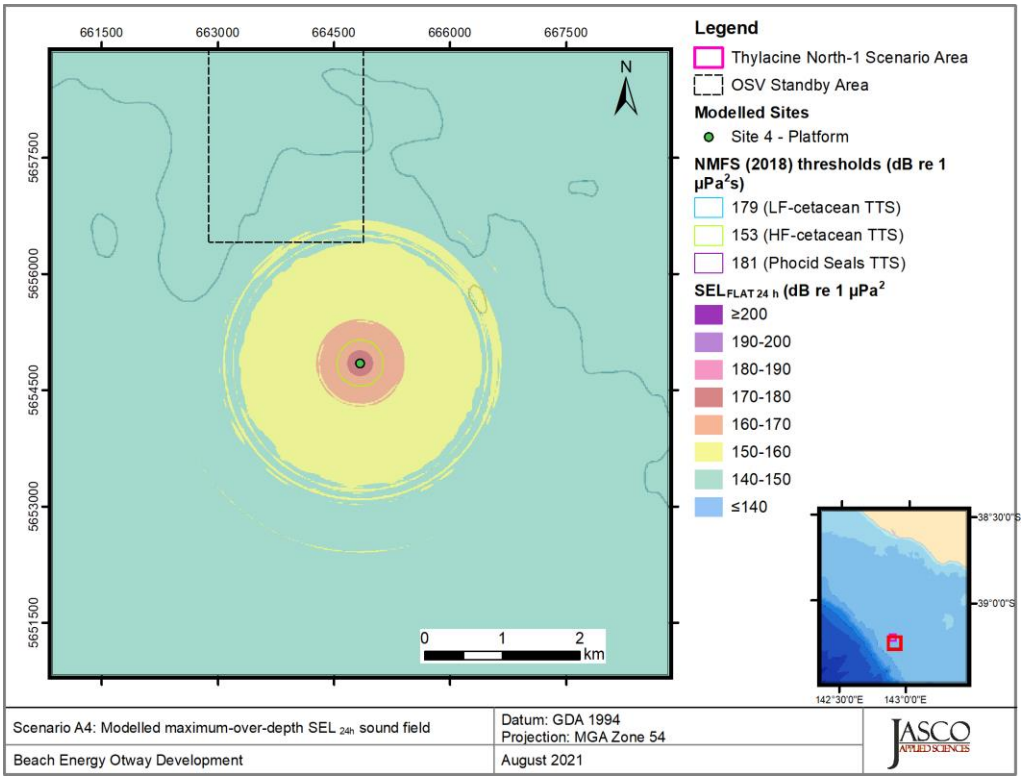

Figure 36. *Thylacine A, Platform Operations (Scenario A4) SEL$_{24h}$:* Sound level contour map showing unweighted maximum-over-depth SEL$_{24h}$ results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

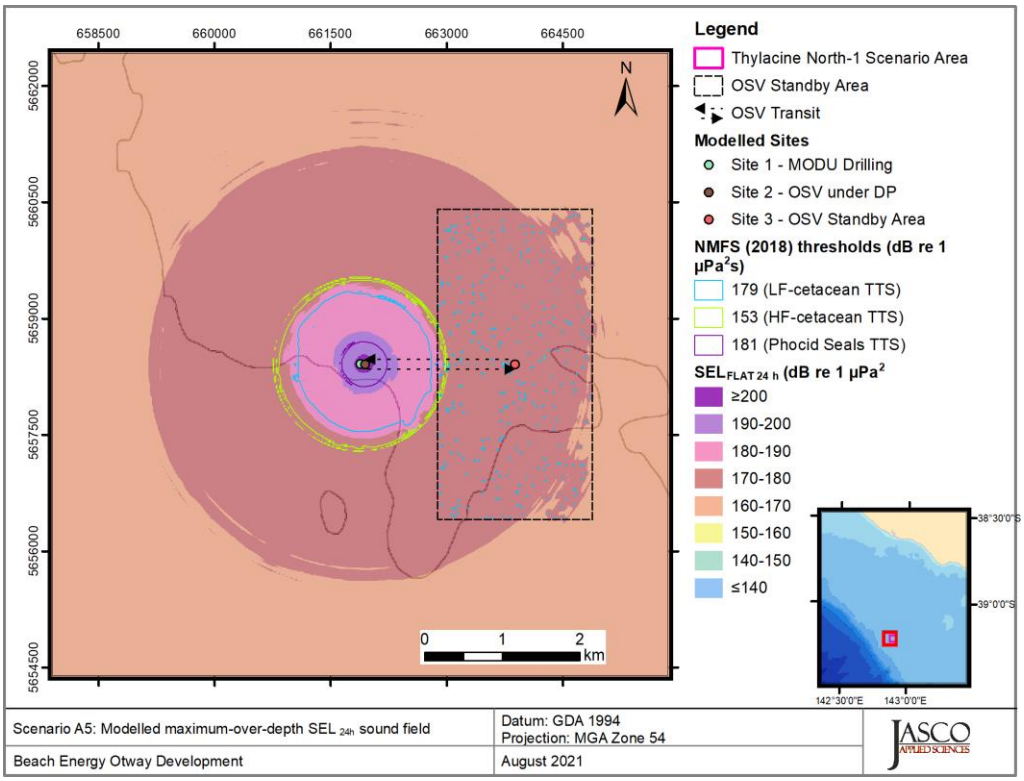

Figure 37. *Thylacine North-1, MODU 4h Resupply Operations (Scenario A5) SEL$_{24h}$:* Sound level contour map showing unweighted maximum-over-depth SEL$_{24h}$ results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

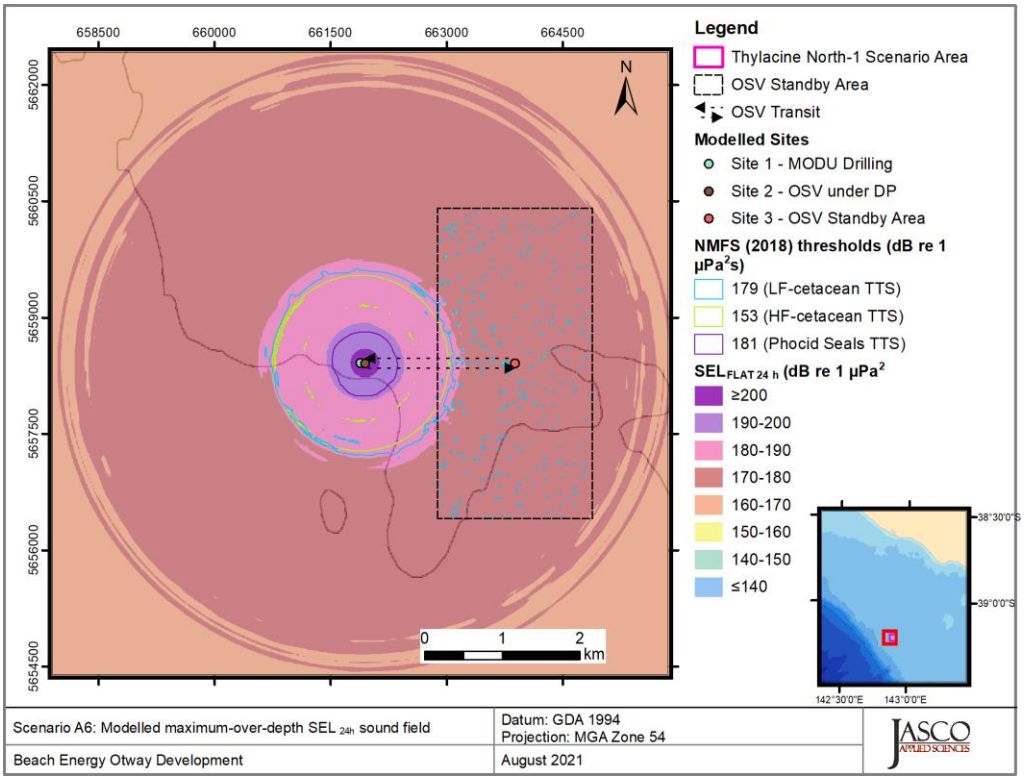

Figure 38. *Thylacine North-1, MODU 8h Resupply Operations (Scenario A6) SEL$_{24h}$:* Sound level contour map showing unweighted maximum-over-depth SEL$_{24h}$ results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.*SEL24h:*

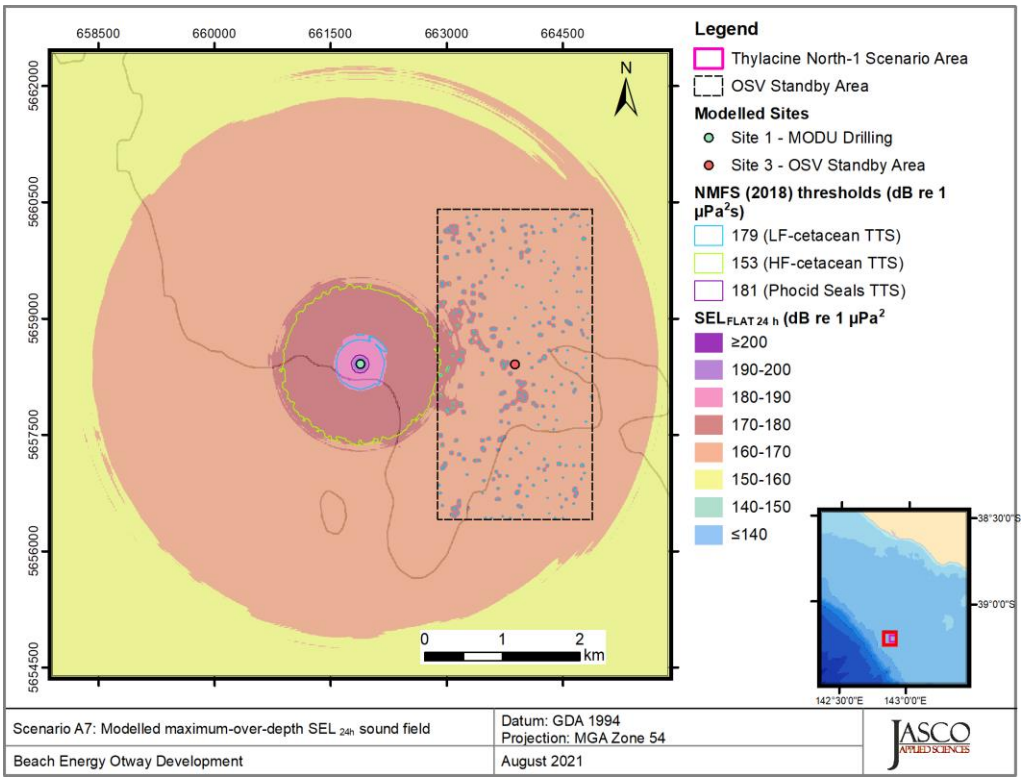

Figure 39. *Thylacine North-1, MODU Drilling and OSV standby (Scenario A7) SEL$_{24h}$:* Sound level contour map showing unweighted maximum-over-depth SEL$_{24h}$ results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

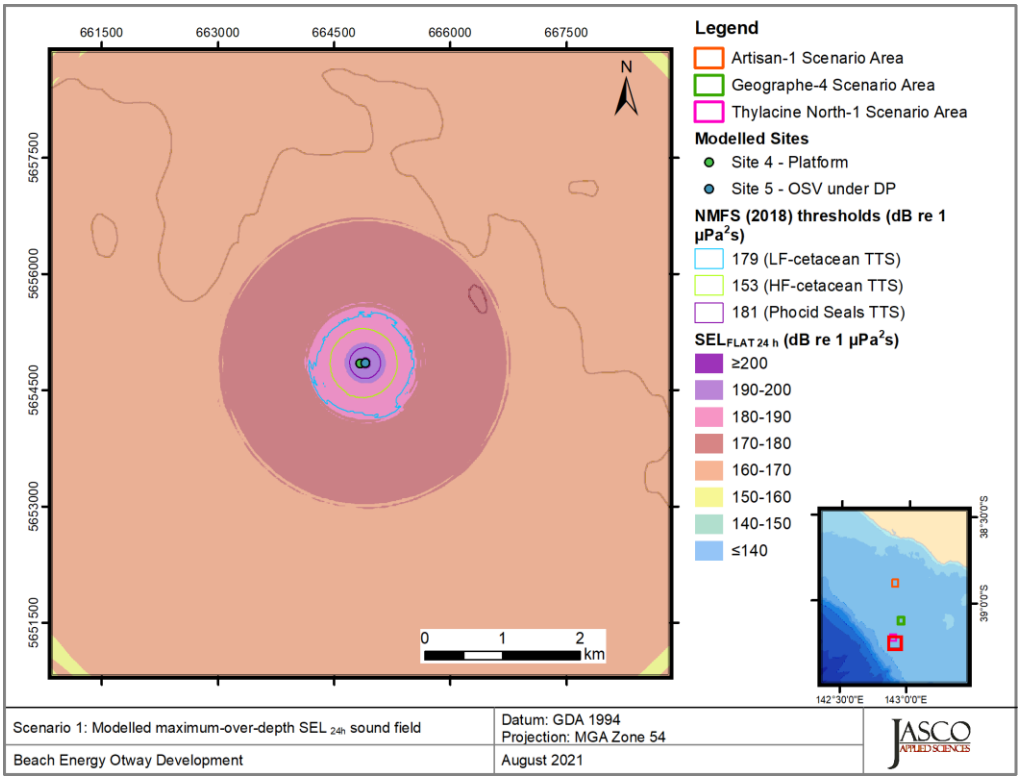

Figure 40. *Thylacine A Platform, 2 h Platform Resupply (Scenario 1) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

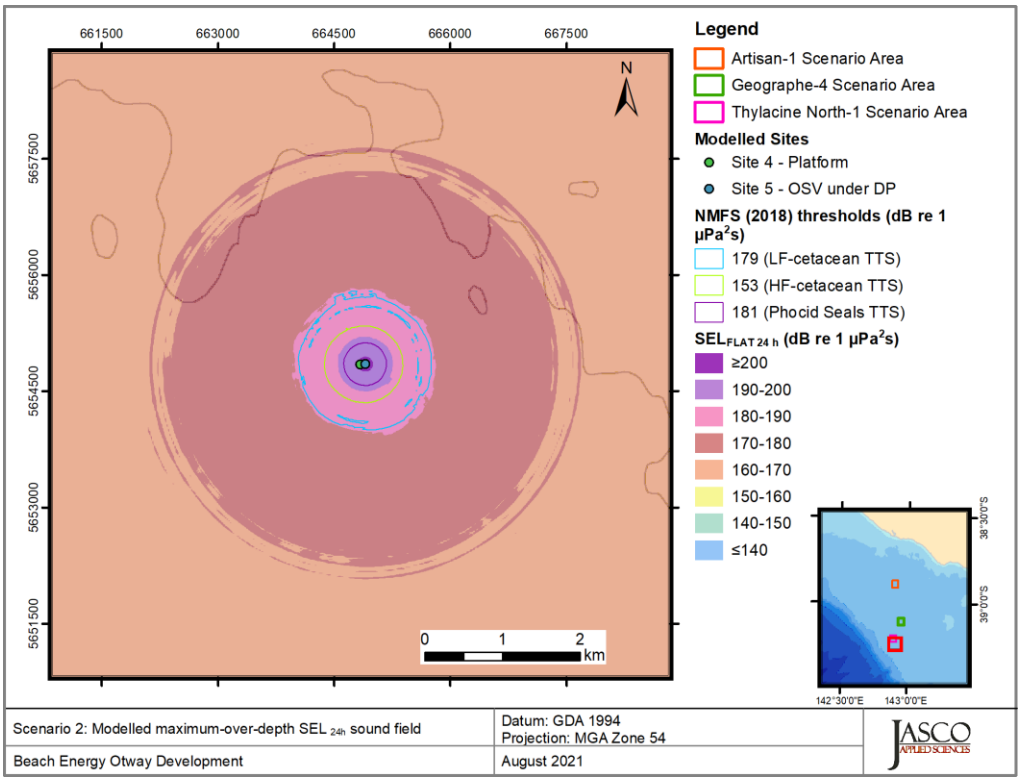

Figure 41. *Thylacine A Platform, 4 h Platform Resupply (Scenario 2) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

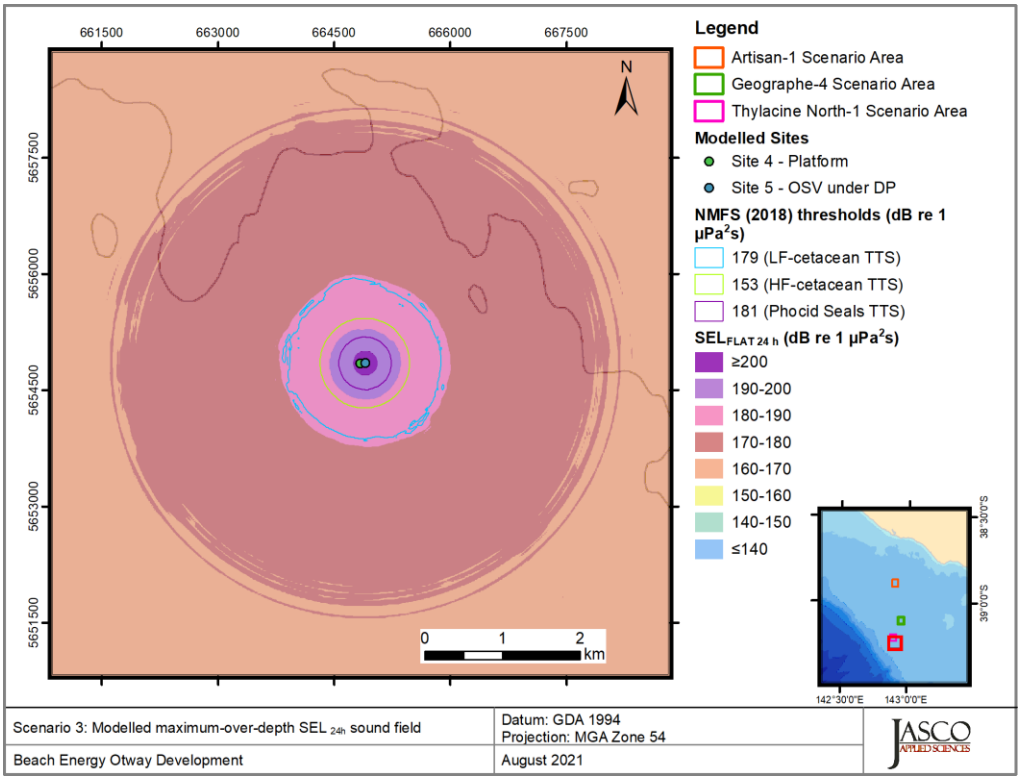

Figure 42. *Thylacine A Platform, 6 h Platform Resupply (Scenario 3) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

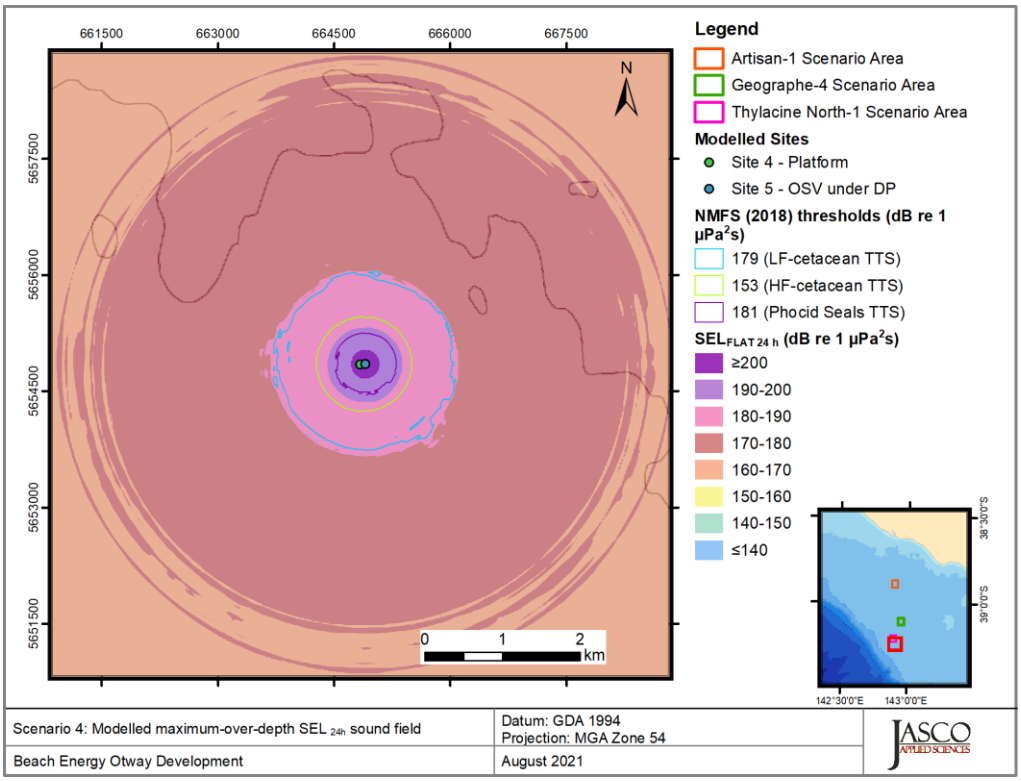

Figure 43. *Thylacine A Platform, 8 h Platform Resupply (Scenario 4) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

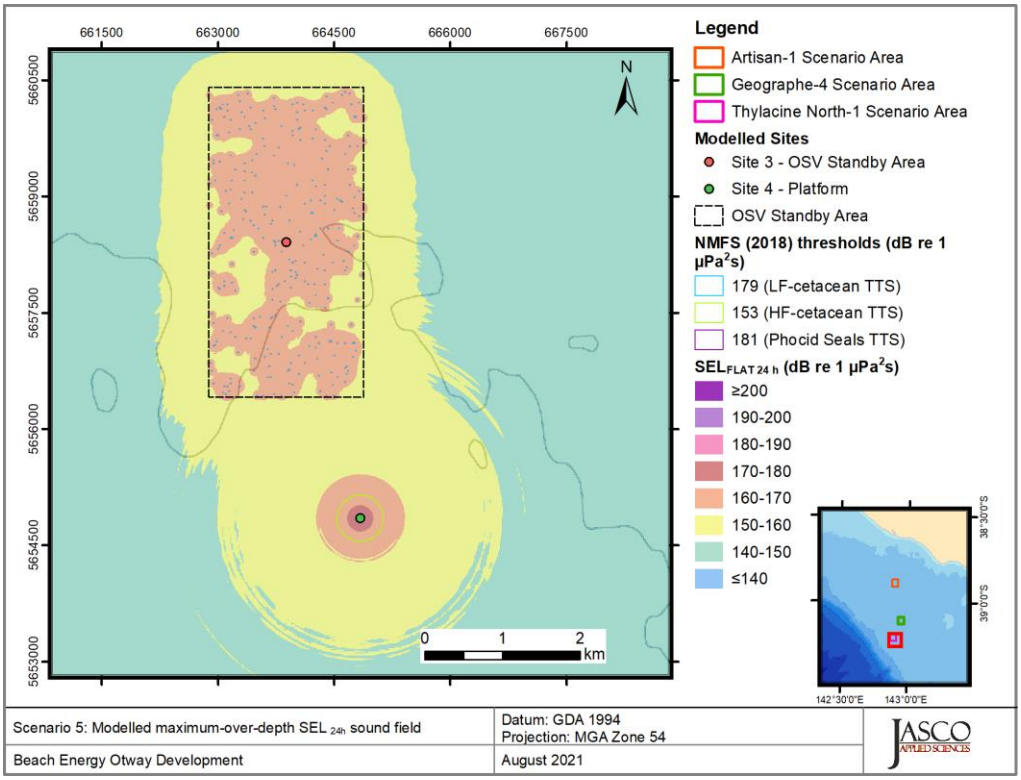

Figure 44. *Thylacine A Platform, 8h OSV standby (Scenario 5) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

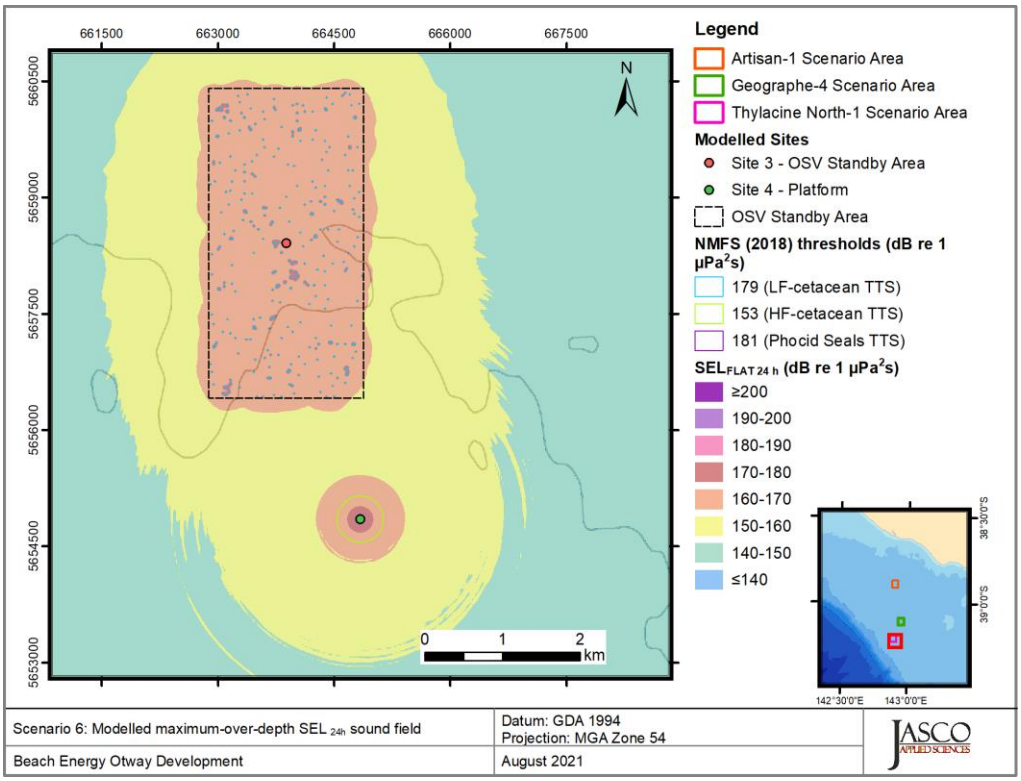

Figure 45. *Thylacine A Platform, 24h OSV standby (Scenario 6) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

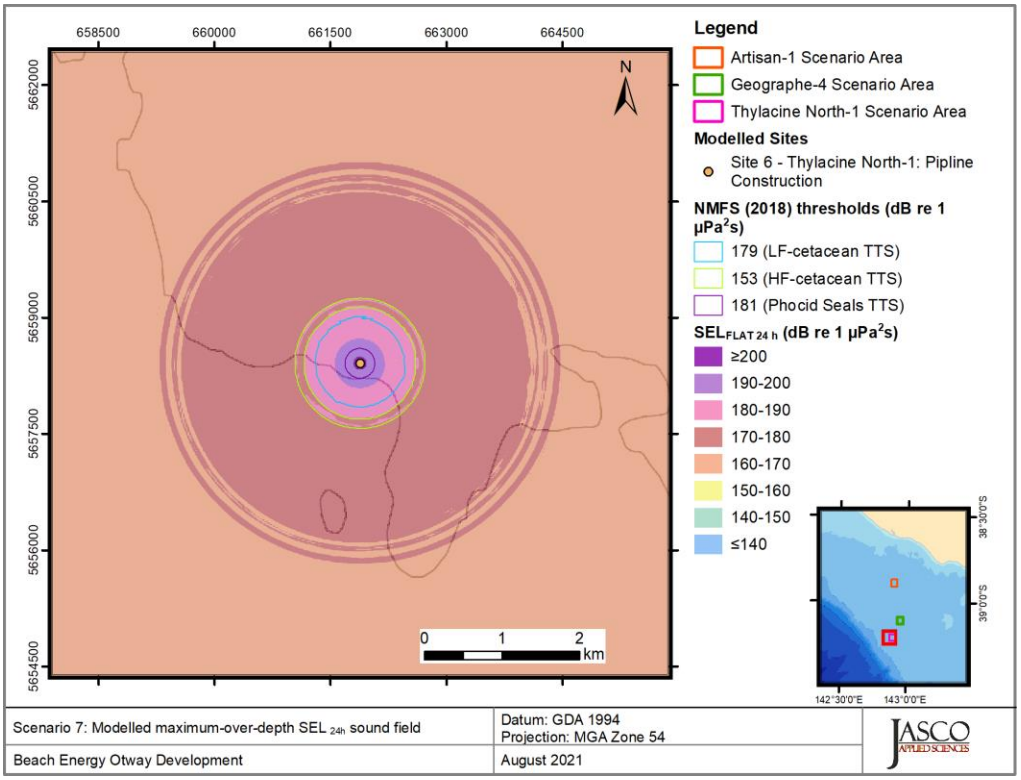

Figure 46. *Thylacine North-1, PLV stationary 20% MCR - June (Scenario 7) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL24h results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

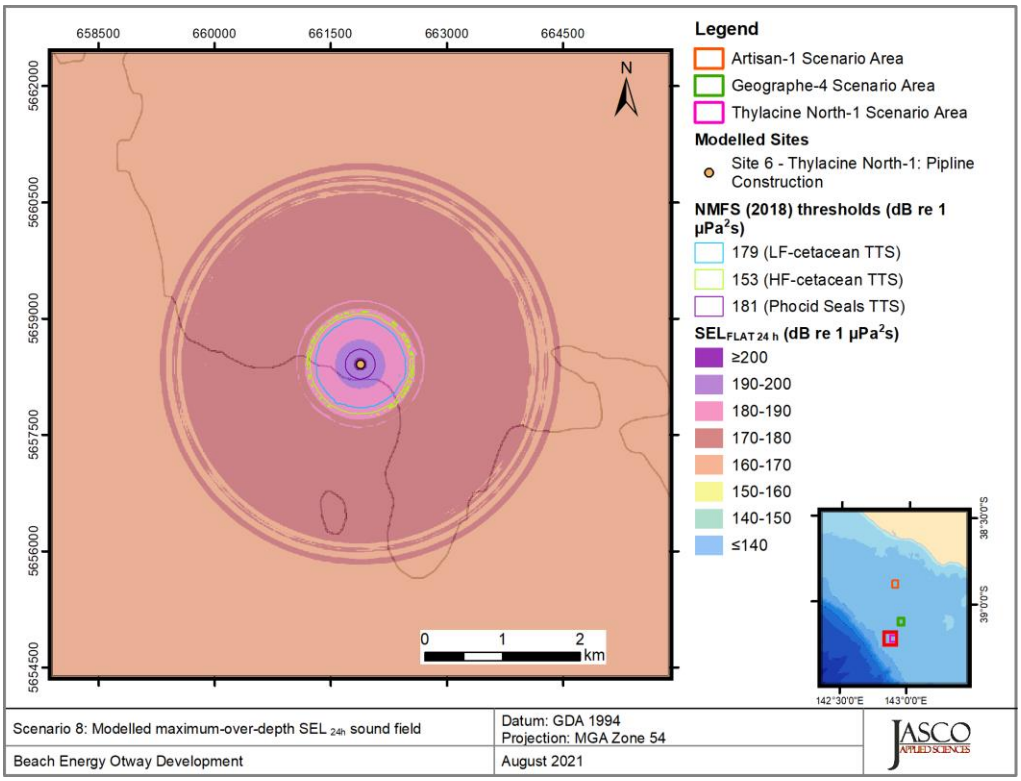

Figure 47. *Thylacine North-1, PLV stationary 20% MCR - November (Scenario 8) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

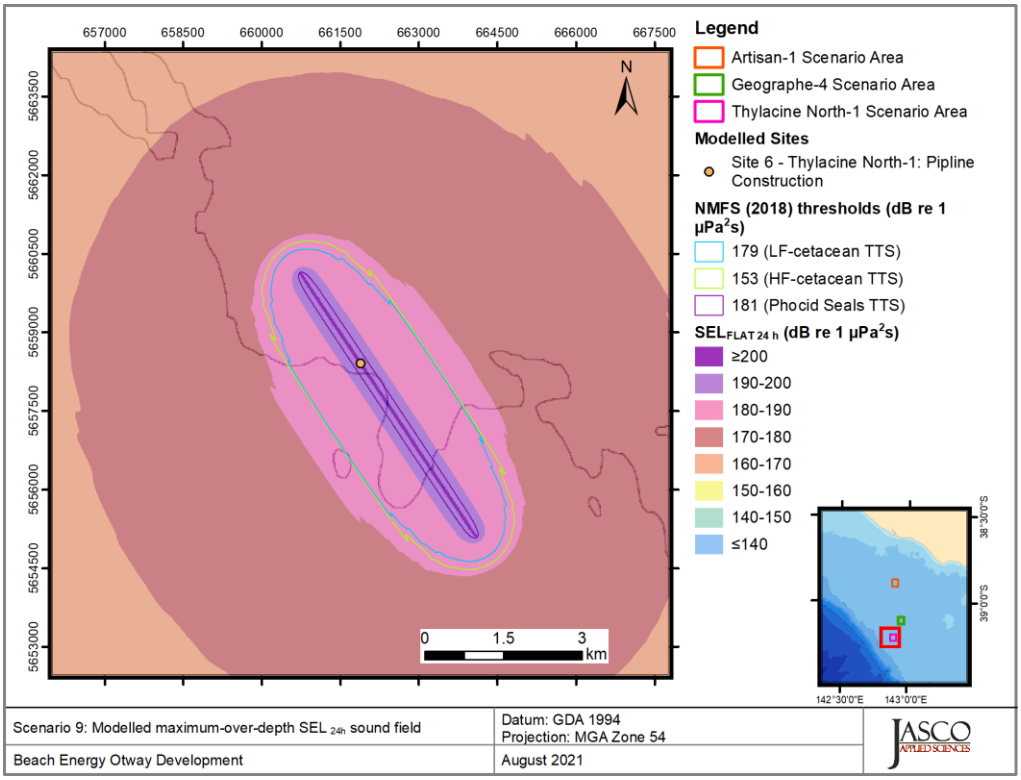

Figure 48. *Thylacine North-1, PLV pipe laying operations 20% MCR - June (Scenario 9) SEL$_{24h}$:* Sound level contour map showing unweighted maximum-over-depth SEL$_{24h}$ results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

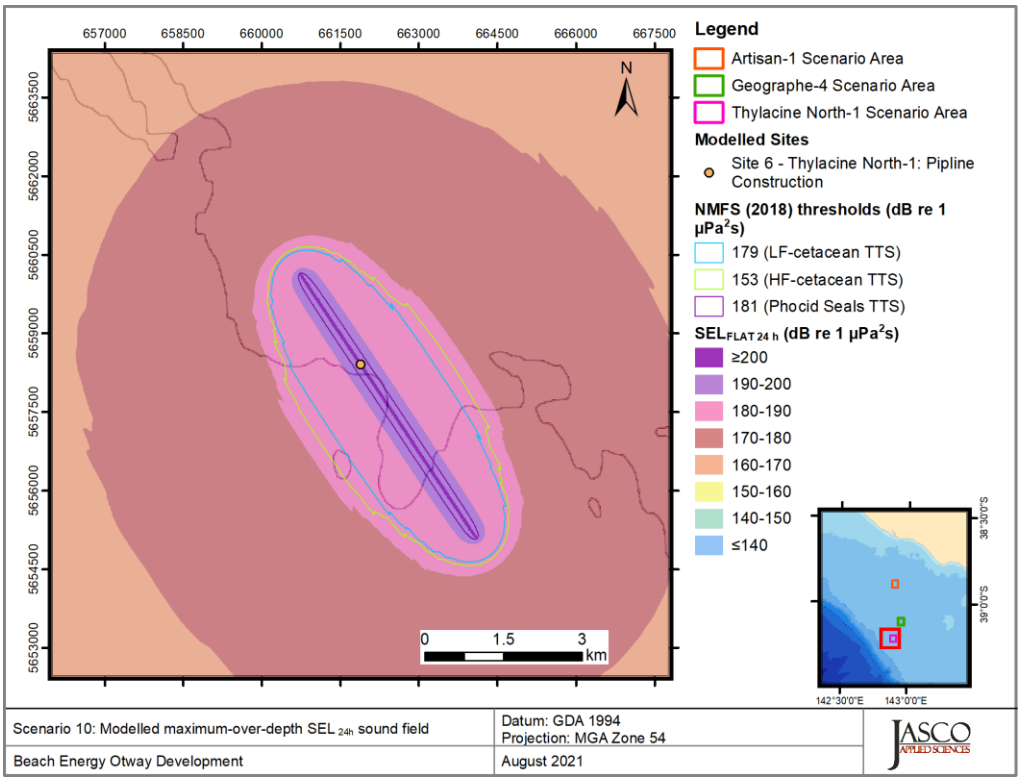

Figure 49. *Thylacine North-1, PLV pipe laying operations 20% MCR - November (Scenario 10) SEL$_{24h}$:* Sound level contour map showing unweighted maximum-over-depth SEL24h results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

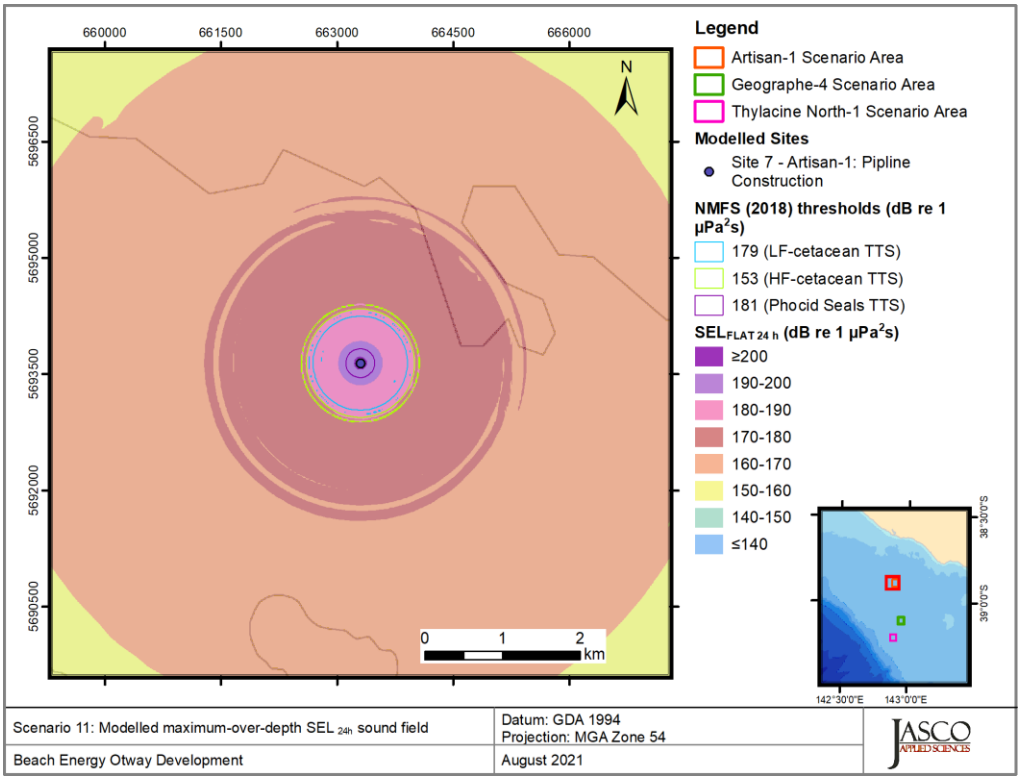

Figure 50. *Artisan-1, PLV stationary 20% MCR - June (Scenario 11) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

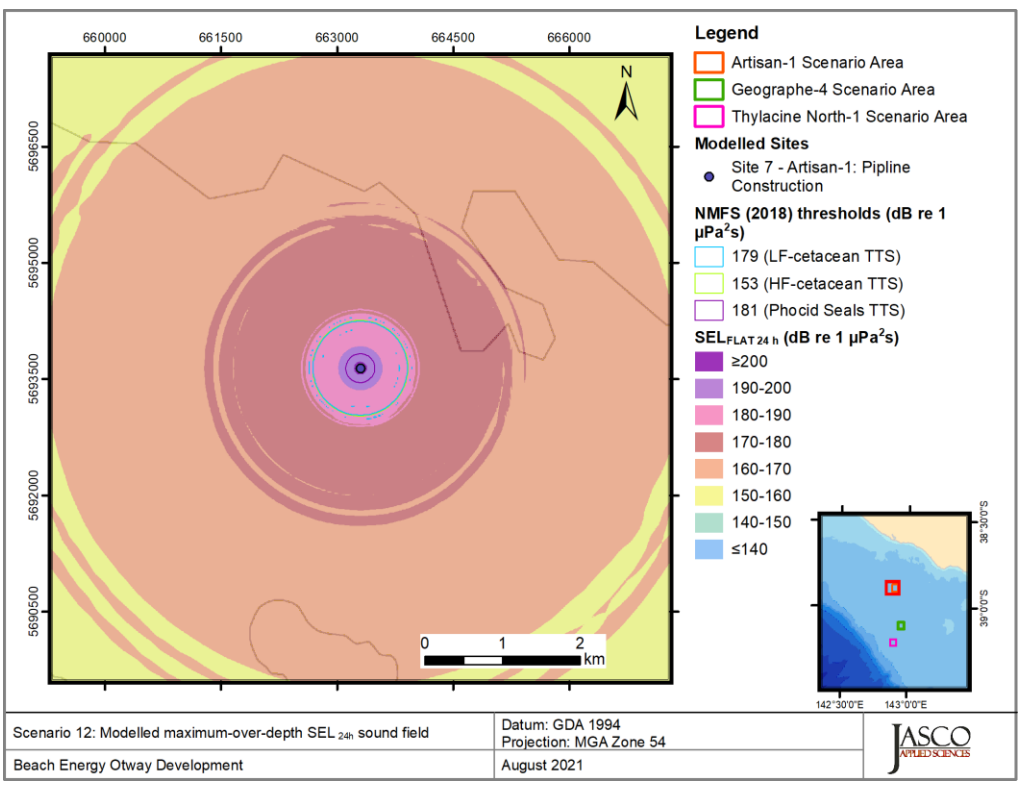

Figure 51. *Artisan-1, PLV stationary 20% MCR - November (Scenario 12) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

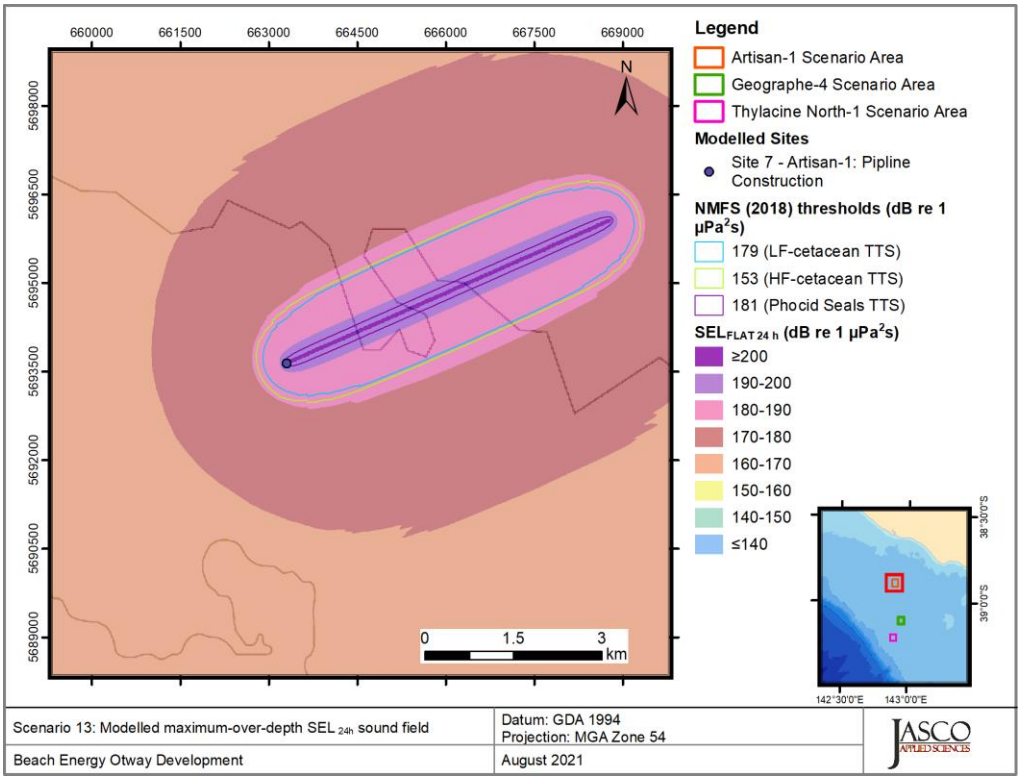

Figure 52. *Artisan-1, PLV pipe laying operations 20% MCR - June (Scenario 13) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

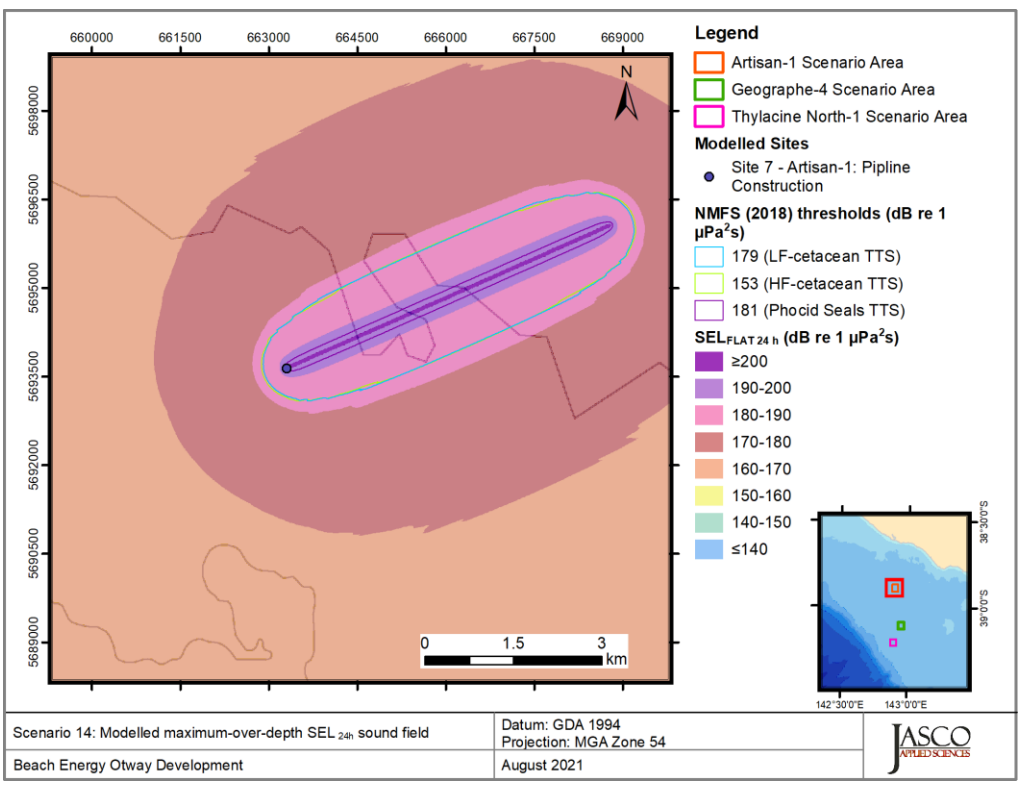

Figure 53. *Artisan-1, PLV pipe laying operations 20% MCR - November (Scenario 14) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

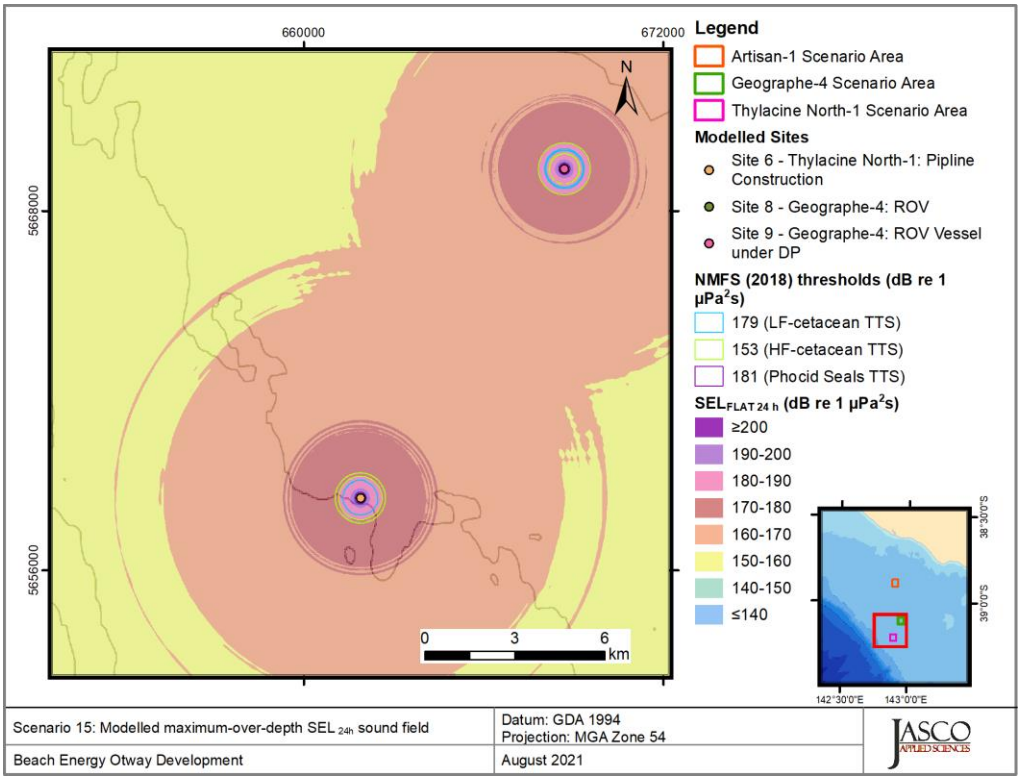

Figure 54. Thylacine North-1, PLV stationary and ROV Operations at Geographe-4 (*20% MCR*) - June (Scenario 15) SEL_{24h}: Sound level contour map showing unweighted maximum-over-depth SEL24h results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

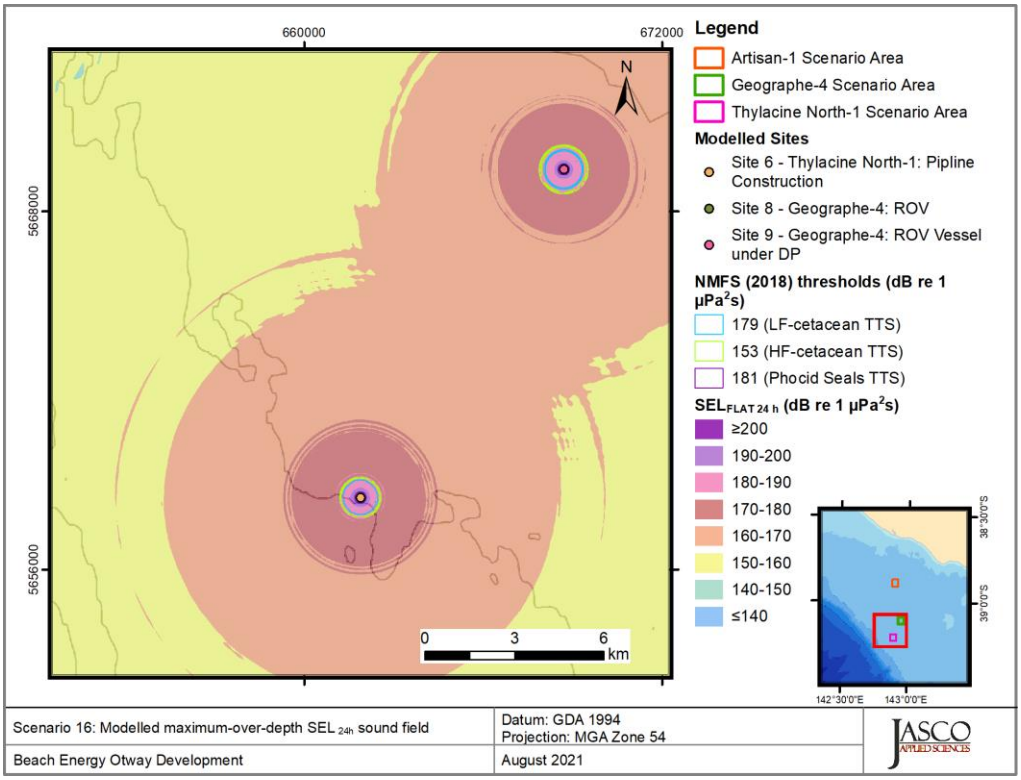

Figure 55. *Thylacine North-1, PLV stationary 20% MCR and ROV Operations at Geographe-4* (*20% MCR*) *- November (Scenario 16) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

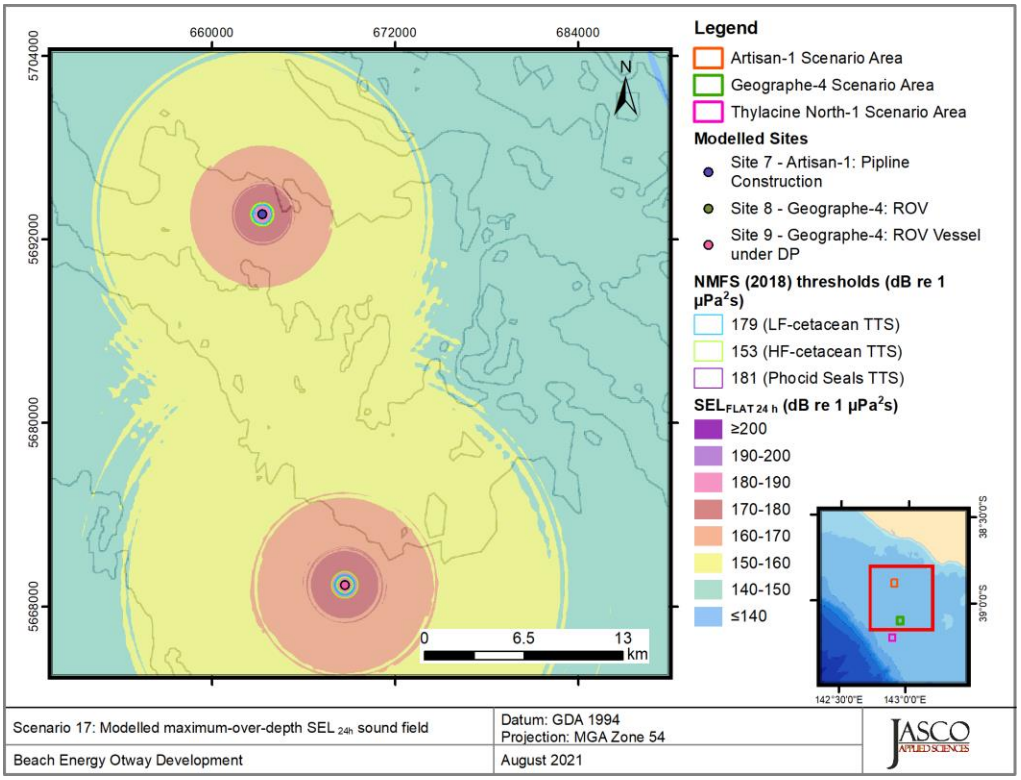

Figure 56. *Thylacine North-1, PLV stationary 20% MCR and ROV Operations at Geographe-4* (*20% MCR*) *- June (Scenario 17) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

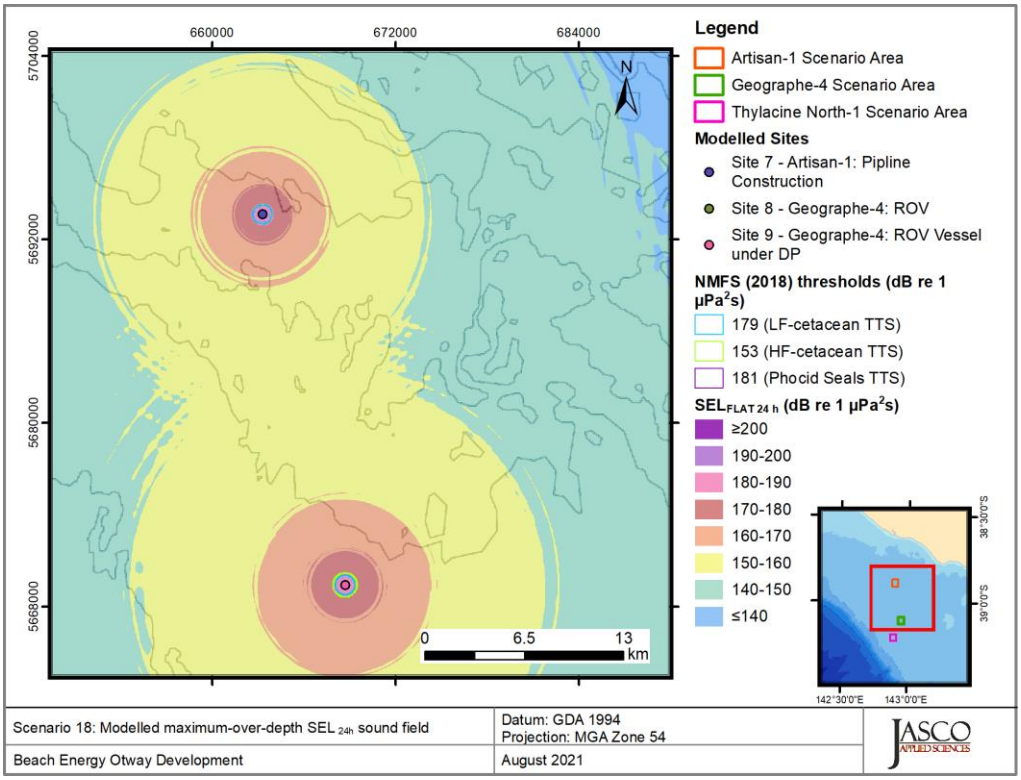

Figure 57. *Artisan-1, PLV stationary 20% MCR and ROV Operations at Geographe-4* (*20% MCR*) *- November (Scenario 18) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

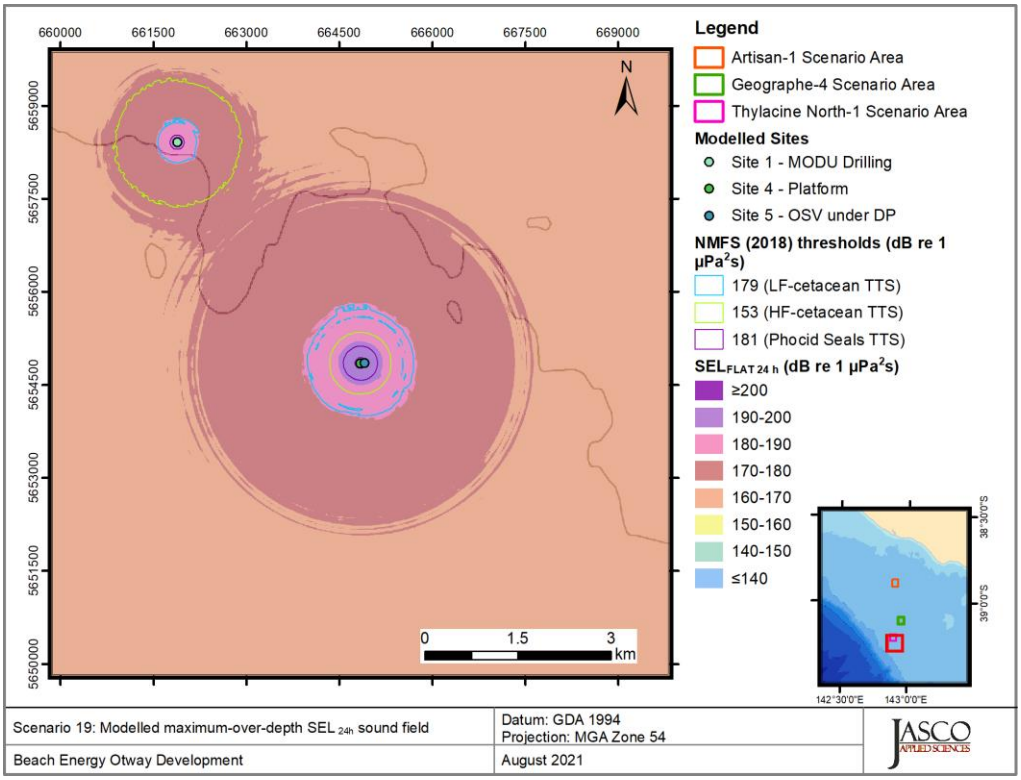

Figure 58. *Thylacine A Platform, 4h Platform Resupply and MODU Drilling (Scenario 19) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

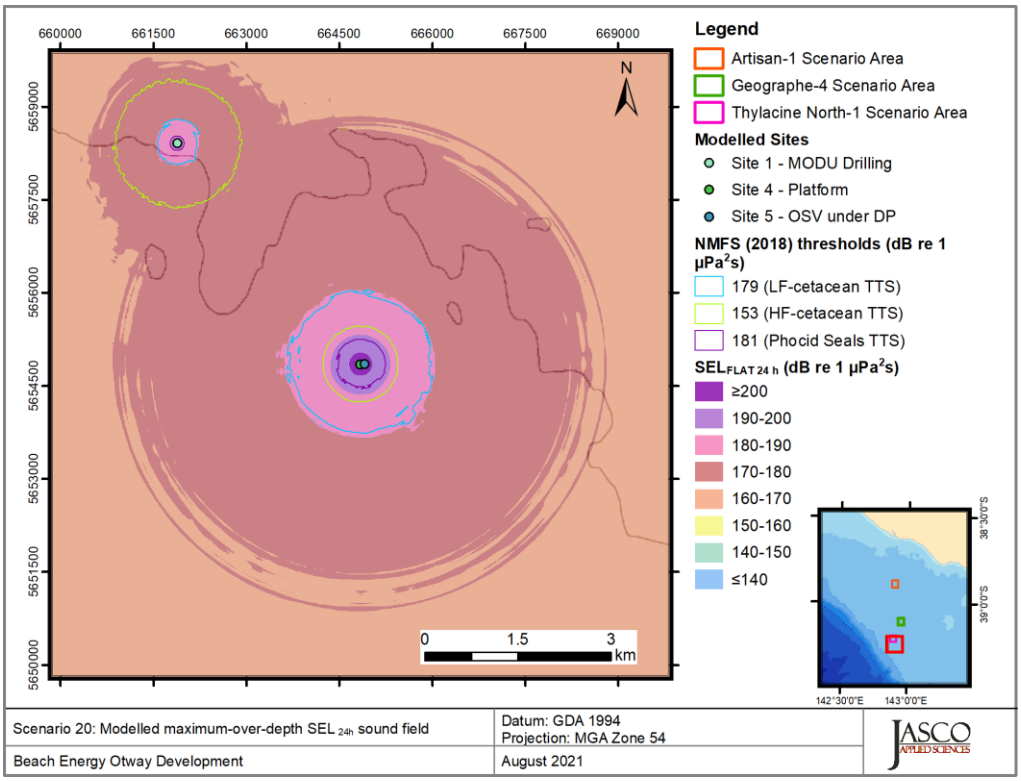

Figure 59. *Thylacine A Platform, 8h Platform Resupply and MODU Drilling (Scenario 20) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

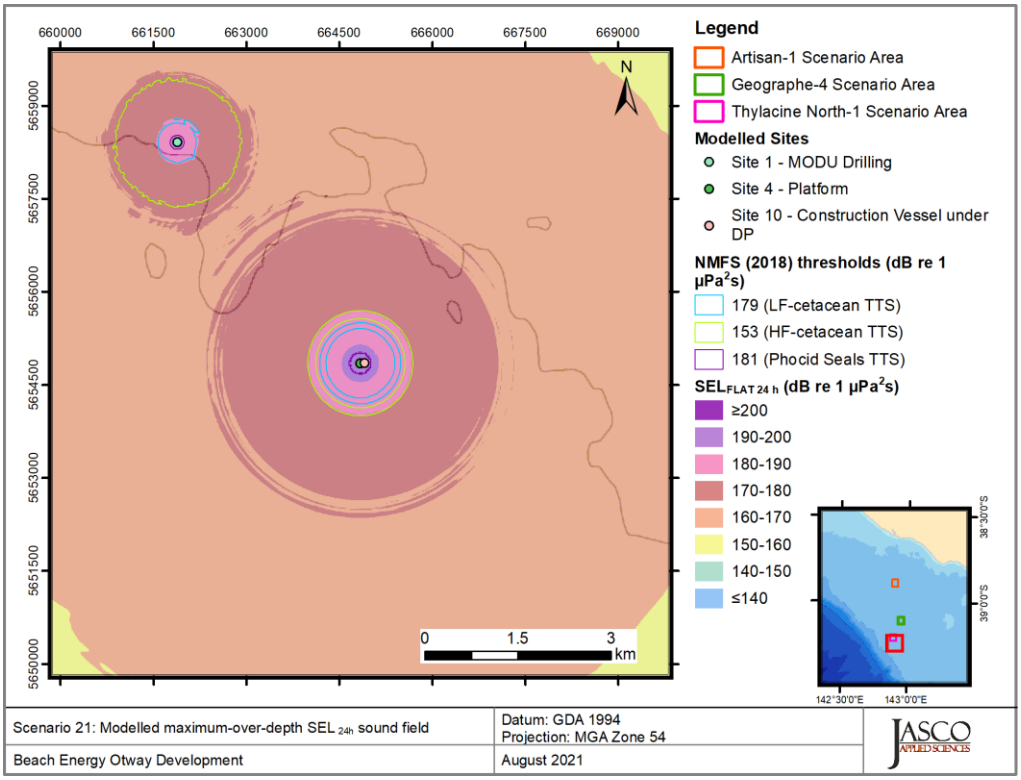

Figure 60. *Thylacine A Platform, Skid installation vessel operating at 20% MCR and MODU Drilling (Scenario 21) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

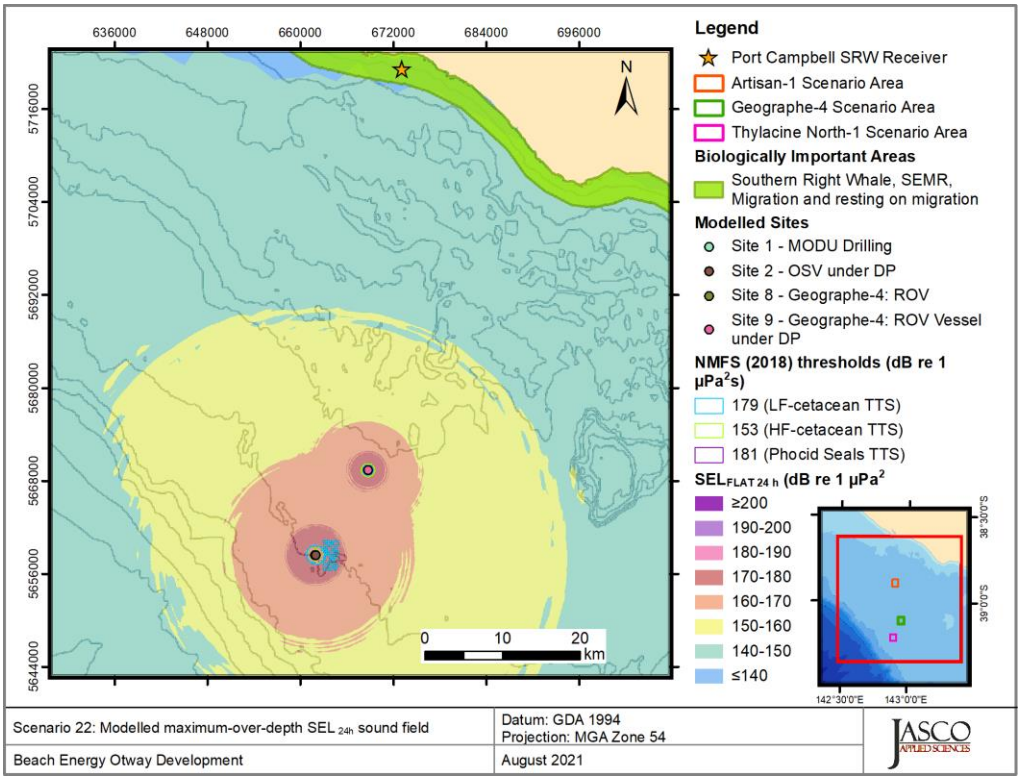

Figure 61 *Concurrent drilling operations at Thylacine North-1 and construction operations (20% MCR) at Geographe-4 (Scenario 22) SEL$_{24h}$:* Sound level contour map showing unweighted maximum-over-depth SEL$_{24h}$ results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

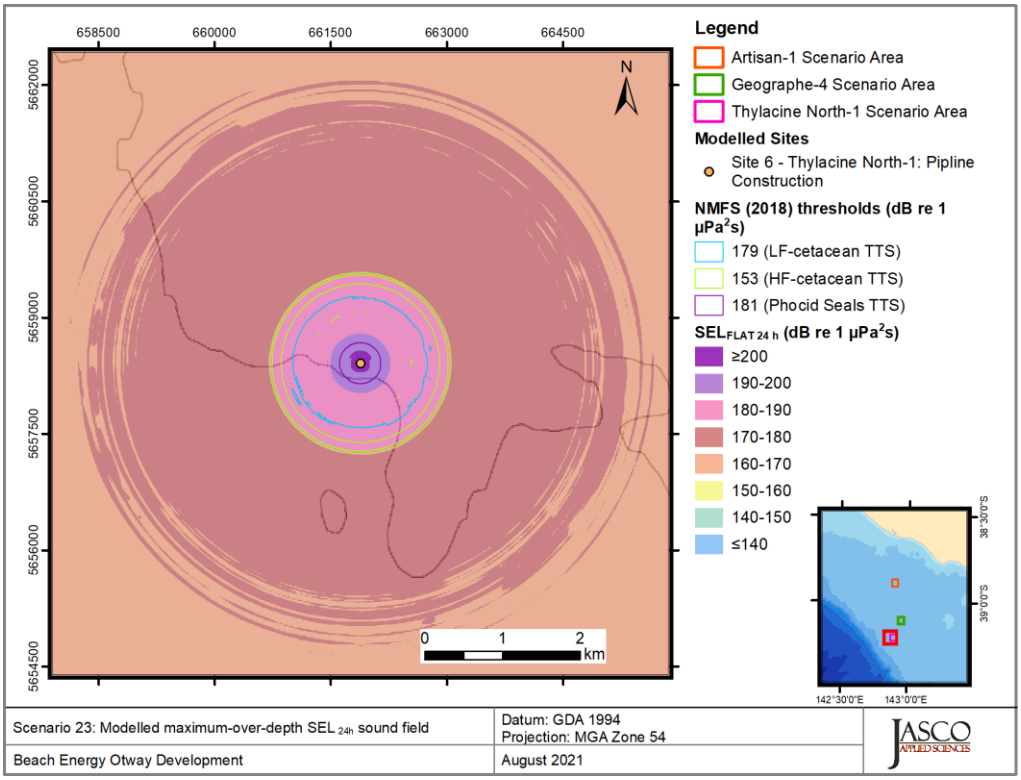

Figure 62. *Thylacine North-1, PLV stationary 40% MCR -June (Scenario 23) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL24h results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

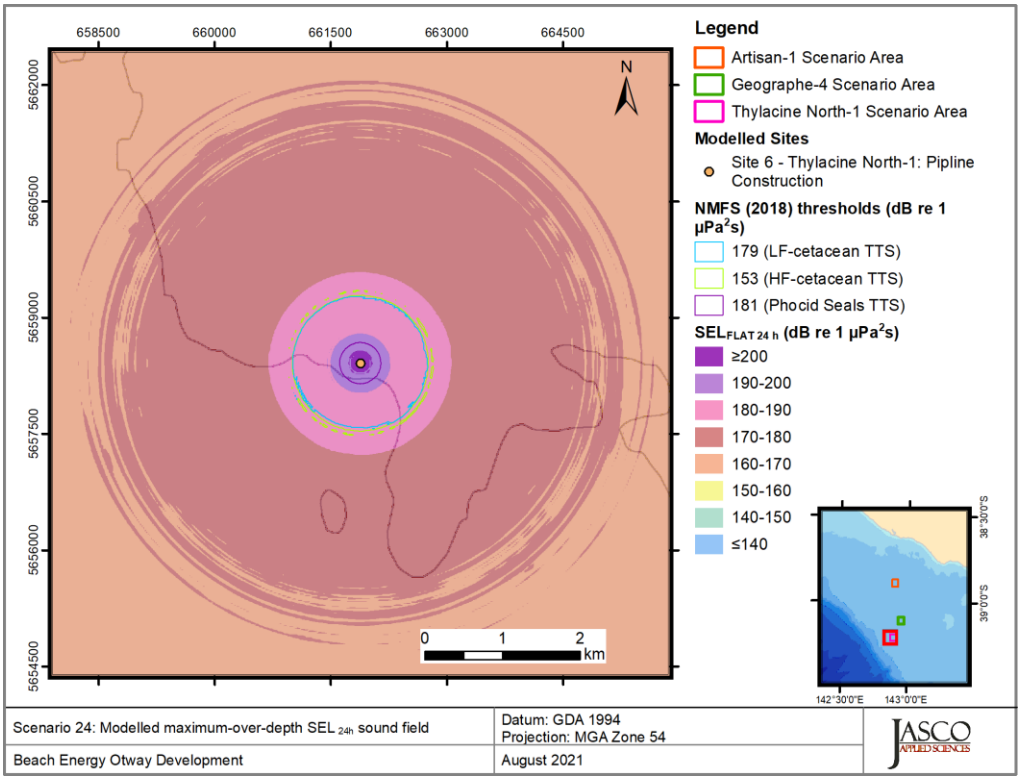

Figure 63. *Thylacine North-1, PLV stationary 40% MCR - November (Scenario 24) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

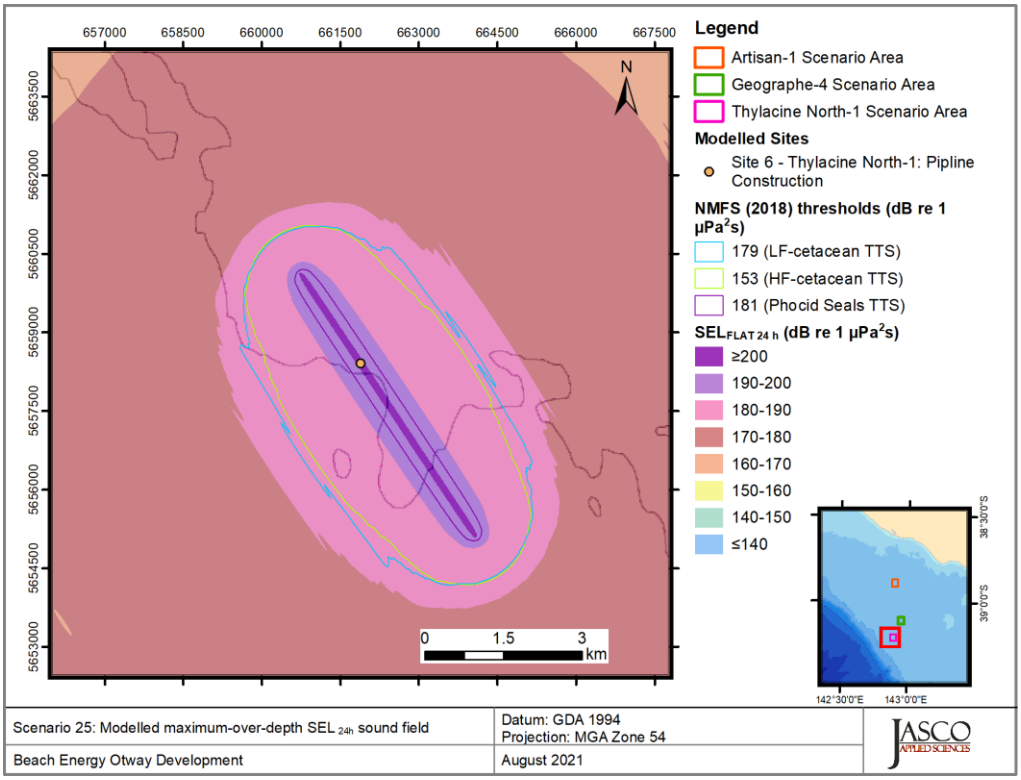

Figure 64. *Thylacine North-1, PLV pipe laying operations 40% MCR - June (Scenario 25) SEL$_{24h}$:* Sound level contour map showing unweighted maximum-over-depth SEL$_{24h}$ results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

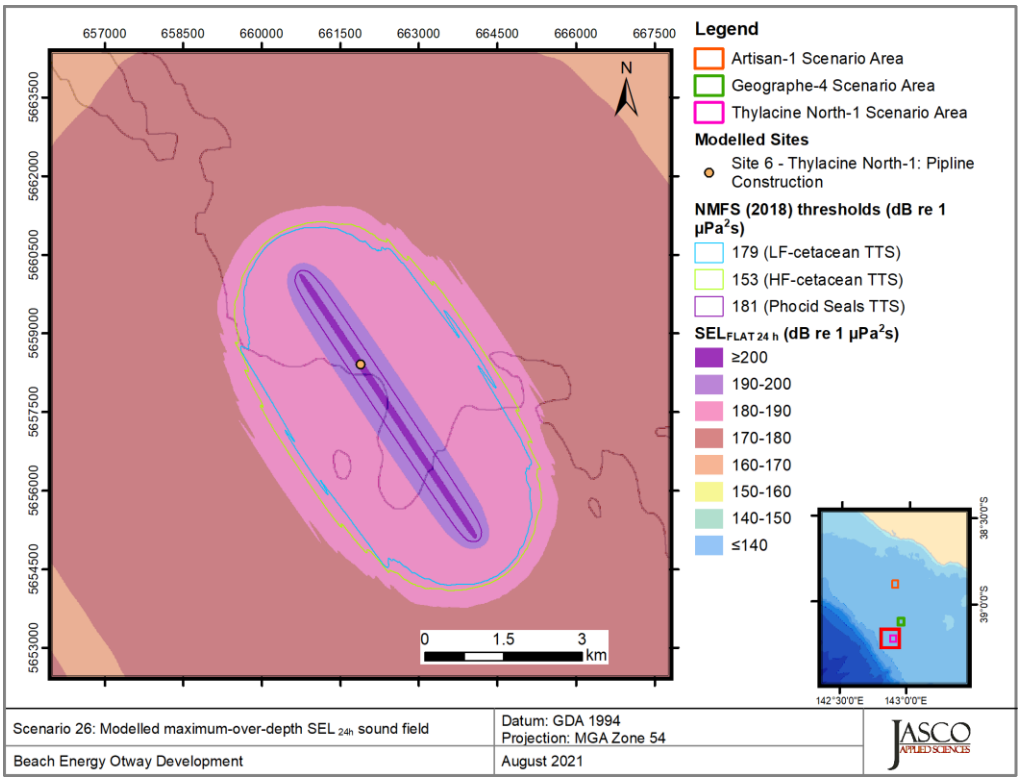

Figure 65. *Thylacine North-1, PLV pipe laying operations 40% MCR - November (Scenario 26) SEL$_{24h}$:* Sound level contour map showing unweighted maximum-over-depth SEL24h results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

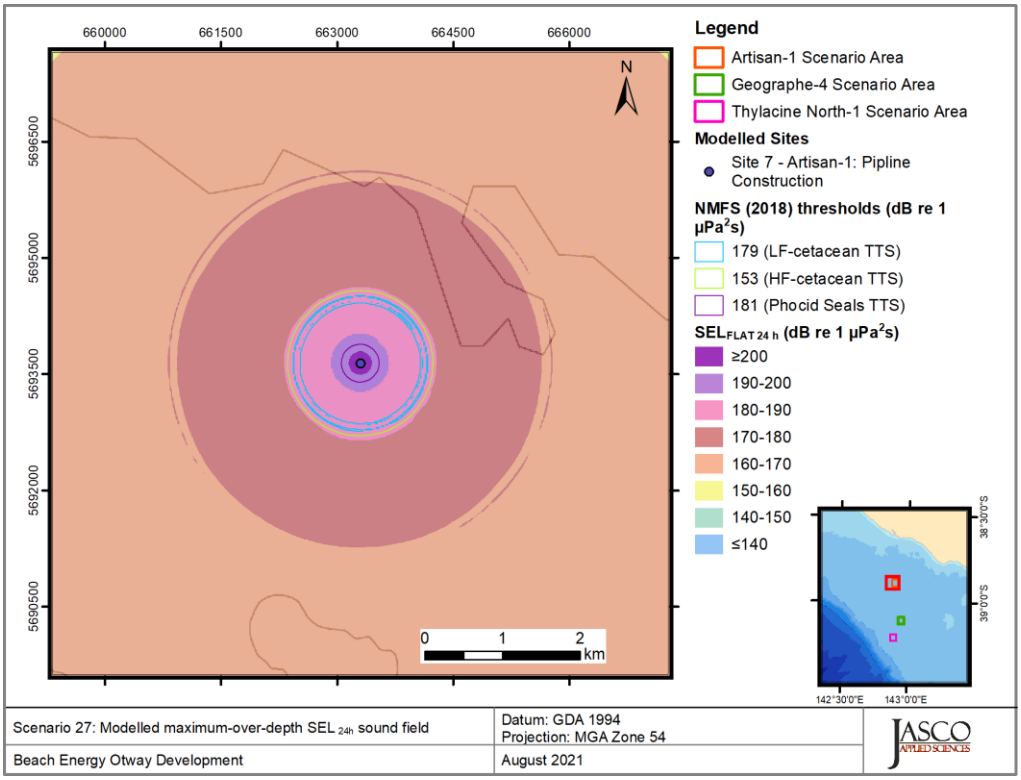

Figure 66. *Artisan-1, PLV stationary 40% MCR - June (Scenario 27) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

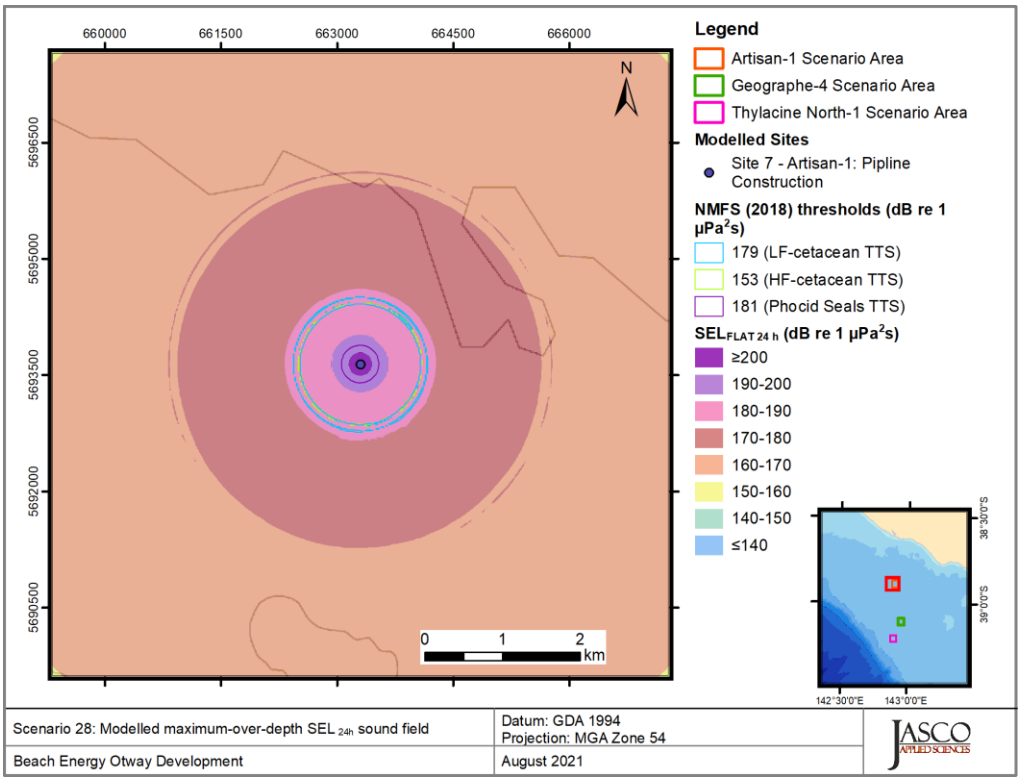

Figure 67. *Artisan-1, PLV stationary 40% MCR - November (Scenario 28) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

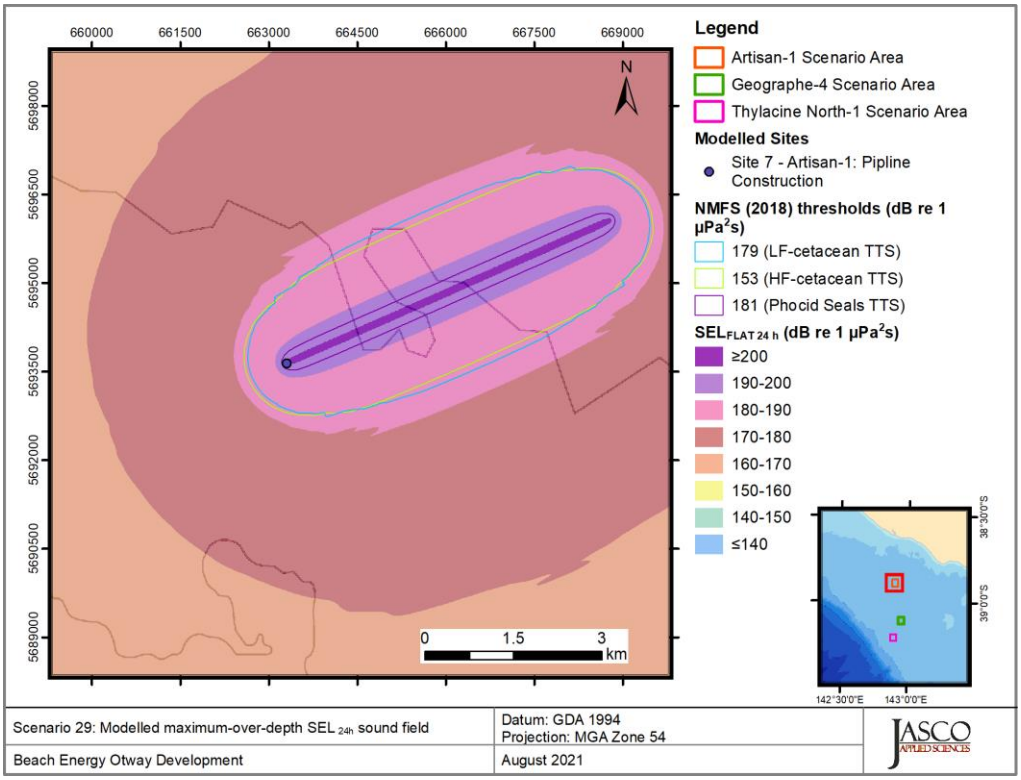

Figure 68. *Artisan-1, PLV pipe laying operations 40% MCR - June (Scenario 29) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

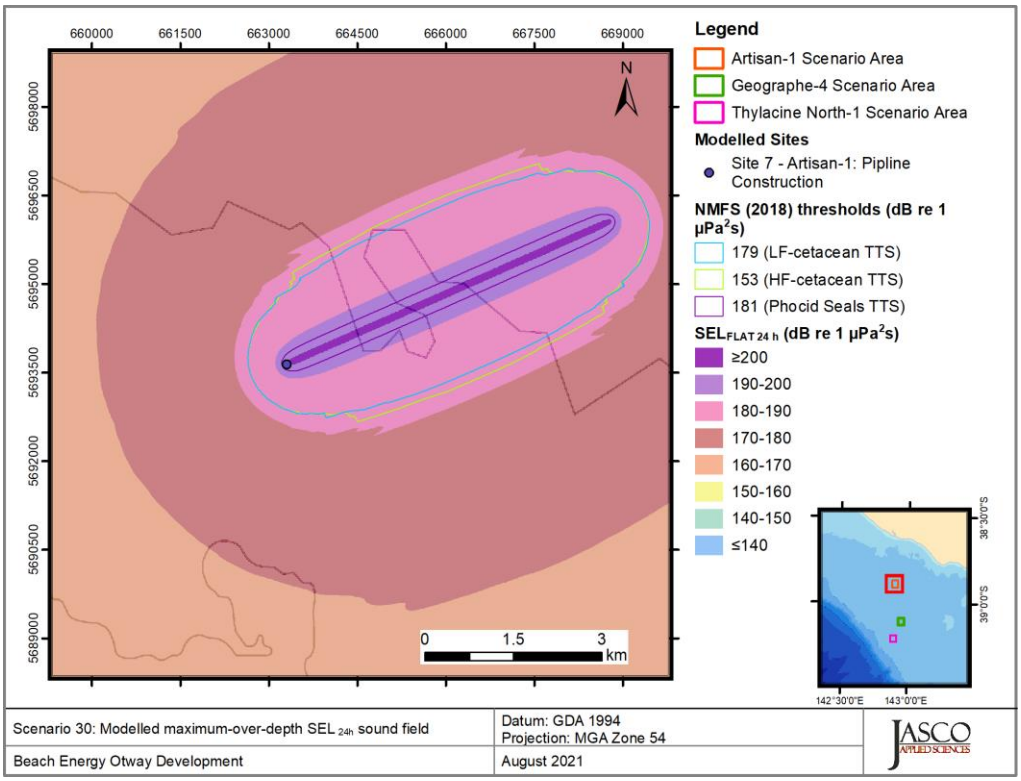

Figure 69. *Artisan-1, PLV pipe laying operations 40% MCR - November (Scenario 30) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

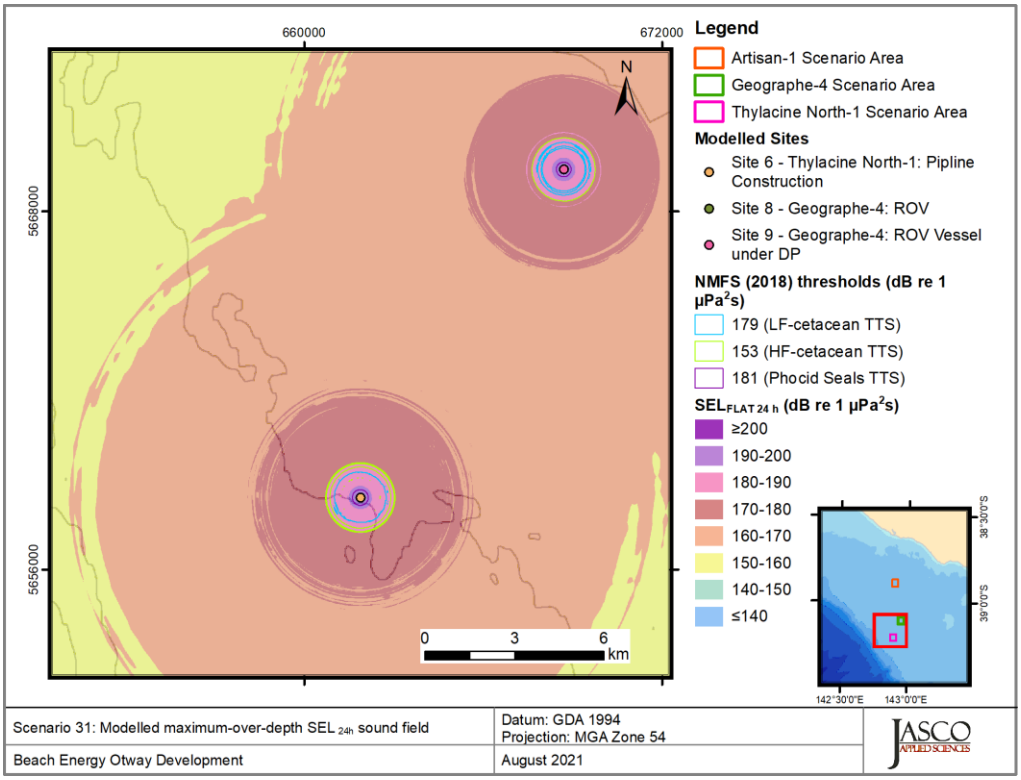

Figure 70. Thylacine North-1, PLV stationary and ROV Operations at Geographe-4 (*40% MCR*) - June (Scenario 31) SEL_{24h}: Sound level contour map showing unweighted maximum-over-depth SEL24h results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

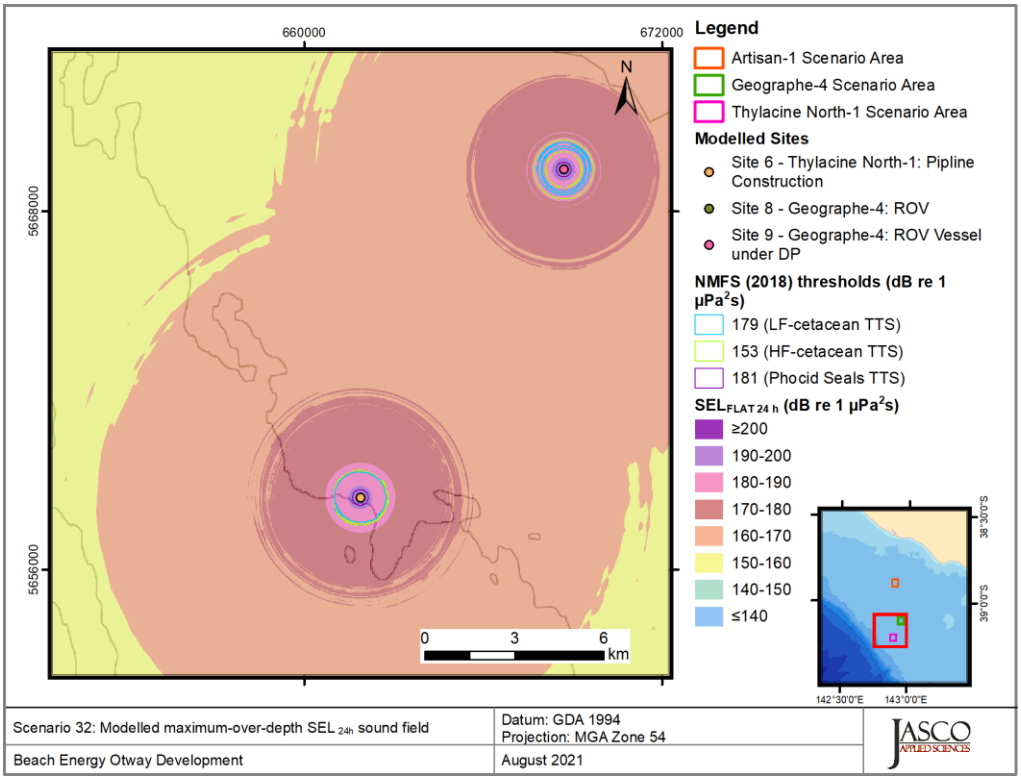

Figure 71. *Thylacine North-1, PLV stationary and ROV Operations at Geographe-4* (*40% MCR*) *- November (Scenario 32) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

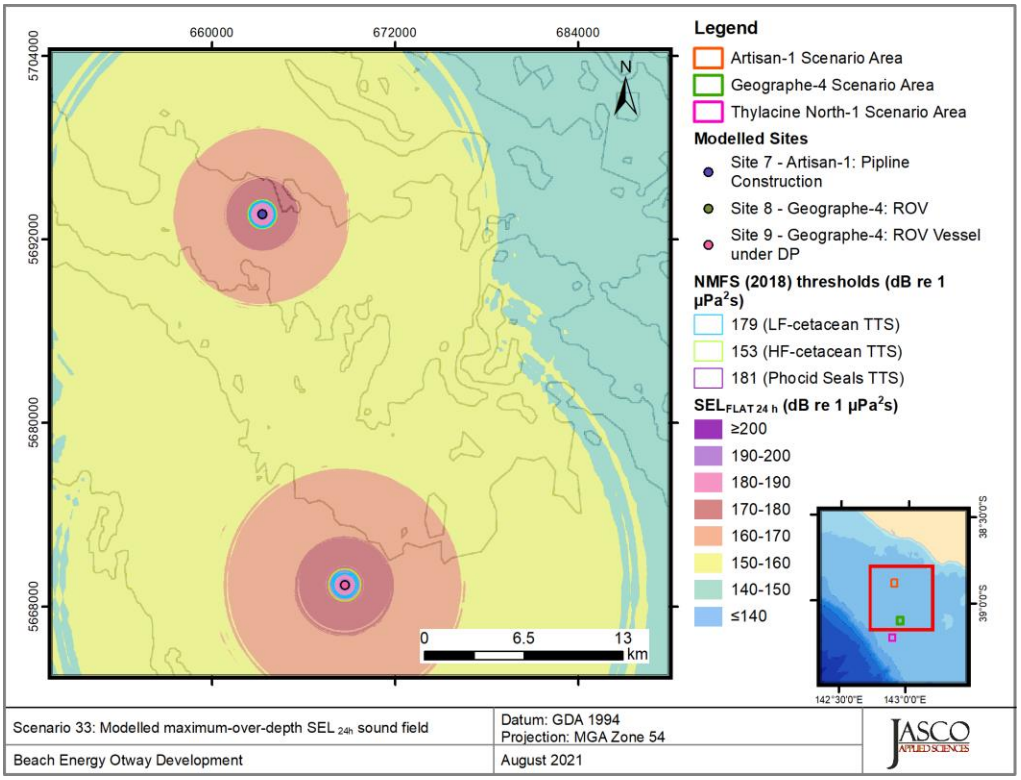

Figure 72. *Thylacine North-1, PLV stationary and ROV Operations at Geographe-4* (*40% MCR*) *- June (Scenario 33) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

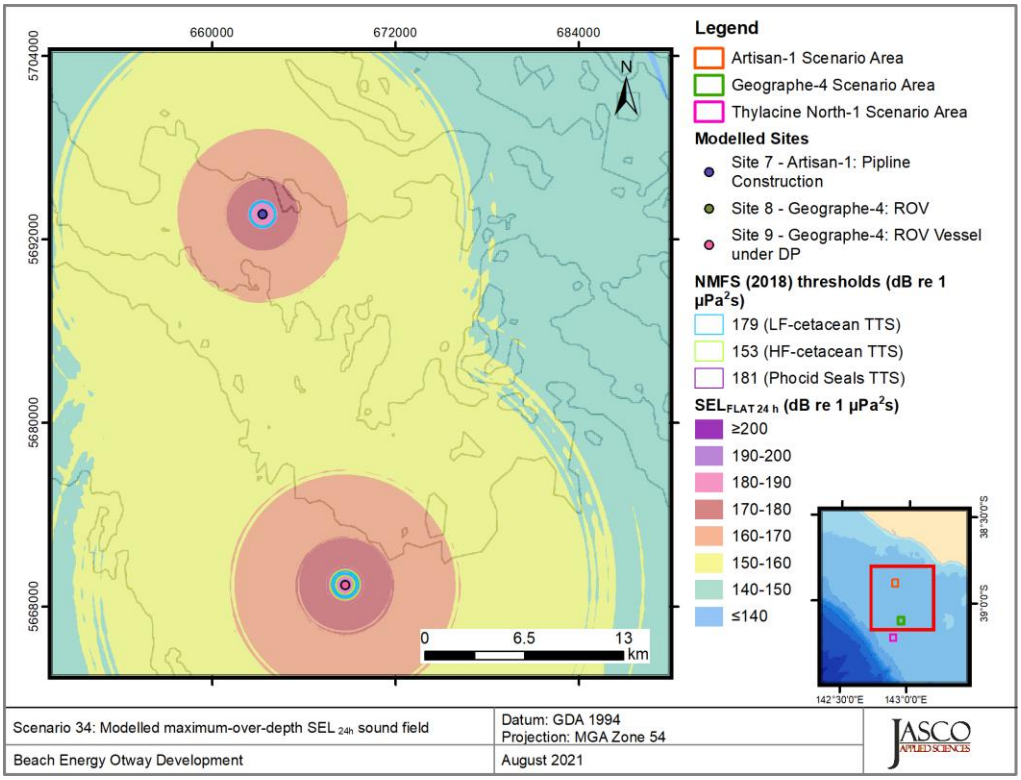

Figure 73. *Artisan-1, PLV stationary and ROV Operations at Geographe-4* (*40% MCR*) *- November (Scenario 34) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

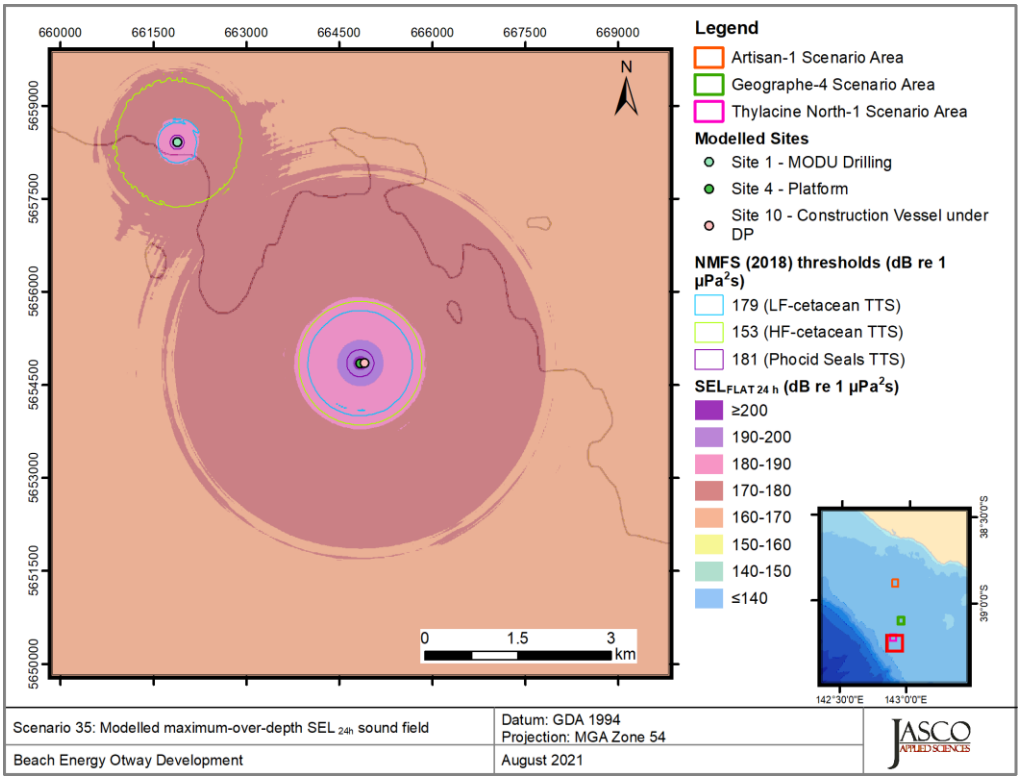

Figure 74. *Thylacine A Platform, Skid installation vessel operating at 40% MCR and MODU Drilling (Scenario 35) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

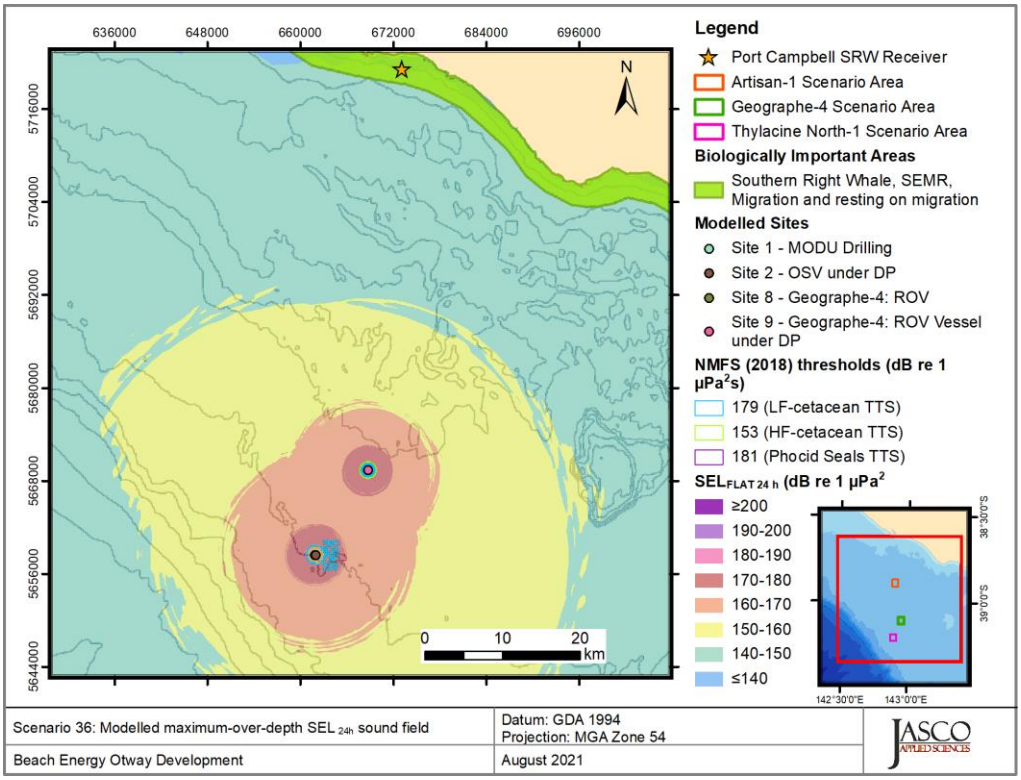

Figure 75 *Concurrent drilling operations at Thylacine North-1 and construction operations (40% MCR) at Geographe-4 (Scenario 36) SEL_{24h}:* Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such that they could not be displayed on a map.

5. Discussion

The approach applied here to model the propagation loss was based is suitable for other locations within the continental shelf portion of the Otway Basin because it is supported by measurements of very similar operational activities (McPherson et al. 2021). However, the accuracy of the modelling propagation loss within this environment depends significantly upon the frequency content of the radiating sound source together with thickness of the sand layer on the calcarenite seabed within Otway region. In general, for these types of sources (i.e., vessels and other sources with a significant amount of energy above a few hundred Hertz) the thinner the sand layer, the greater the propagation loss. Having accurate source and site-specific information reduces the amount of uncertainty results due to model inputs uncertainty particularly when seemingly small changes in parametrisation can have reasonable significant changes in predicted results.

The distances to the effect thresholds based on modelling conducted here and supported by the results of the measurement study McPherson et al. (2021) are generally smaller when compared to those originally presented in Koessler et al. (2020). The understanding of the environment gained through the measurement study allowed for the geological environment to be represented in a site-specific fashion, and a more appropriate configuration of numerical models to represent the environmental propagation loss particularly with the layered calcarenite seabed. The application of the revised modelling approach to represent other Beach Energy activities on the continental shelf of the Otway Basin would be appropriate.

The maximum-over-depth sound field maps presented above show a few instances where threshold contours form concentric ‘rings’ around a source. These are likely the product of propagation interference patterns and the calculations method to account for the loss associated with the cemented limestone seabed (Section 6.2 in McPherson et al. (2021)). Variations in the sound field can produce local maxima and minima in loss which can results in specific levels dipping below thresholds before reaching a maximum extent. Moreover, the near constant bathymetry around most sources produces axial symmetry around a given source. Together these two

factors can form the observed ‘rings’. Nevertheless, the maximum extent of these contours and associated tabulated radii are a valid prediction of the effect ranges that can be expected from the modelled operations.

The effect of different seasonality on predicted distances to the effect thresholds was minor but present. Considering the modelled Otway Offshore Project Construction scenarios, each scenario was modelled with a sound speed profiles for the ‘worst case over the year’ and for a period pygmy blue whales are present in the region, between November and January. These sound speed profiles were respectively selected as June and November. The effect thresholds applied to pygmy blue was the low-frequency cetacean SEL_{24h} thresholds based on NMFS (2018). The sound speed profile of November generally produced small distances to the low-frequency cetacean PTS and TTS threshold for the same operational activities modelled with a June SSP, see Tables 13–15. The seasonal differences were at most a few hundred metres. The receiver SPL level at the Port Campbell receiver locations presented in Table 10 are therefore expected to be lower in in November.

The SEL_{24h} is a cumulative metric that reflects the dosimetric impact of noise levels within 24 hours based on the assumption that an animal is consistently exposed to such noise levels at a fixed position. The corresponding SEL_{24h} radii represent an unlikely worst-case scenario. More realistically, marine mammals (as well as fish and turtles) are unlikely to stay in the same location for 24 hours. Therefore, a reported radius for SEL_{24h} criteria does not mean that marine fauna travelling within this radius of the source will be injured, but rather that an animal could be exposed to the sound level associated with impairment (either PTS or TTS) if it remained in that location for 24 hours.

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Appendix A. Acoustic Metrics

A.1. Pressure Related Acoustic Metrics

Underwater sound pressure amplitude is measured in decibels (dB) relative to a fixed reference pressure of p_0 = 1 µPa. Because the perceived loudness of sound, especially impulsive noise such as from seismic airguns, pile driving, and sonar, is not generally proportional to the instantaneous acoustic pressure, several sound level metrics are commonly used to evaluate noise and its effects on marine life. We provide specific definitions of relevant metrics used in the accompanying report. Where possible we follow the ANSI and ISO standard definitions and symbols for sound metrics, but these standards are not always consistent.

The sound pressure level (SPL; L_p; dB re 1 µPa) is the rms pressure level in a stated frequency band over a specified time window (T, s) containing the acoustic event of interest. It is important to note that SPL always refers to a rms pressure level and therefore not instantaneous pressure:

$$L_p = 10\log_{10}\left(\frac{1}{T}\int_T p^2(t)dt \Big/ p_0^2\right) \tag{A-1}$$

The SPL represents a nominal effective continuous sound over the duration of an acoustic event, such as the emission of one acoustic pulse, a marine mammal vocalization, the passage of a vessel, or over a fixed duration. Because the window length, T, is the divisor, events with similar sound exposure level (SEL) but more spread out in time have a lower SPL.

The sound exposure level (SEL; L_E; $L_{E,p}$; dB re 1 µPa²·s) is a measure related to the acoustic energy contained in one or more acoustic events (N). The SEL for a single event is computed from the time-integral of the squared pressure over the full event duration (T):

$$L_E = 10\log_{10}\left(\int_T p^2(t)dt \Big/ T_0 p_0^2\right) \tag{A-2}$$

where T_0 is a reference time interval of 1 s. The SEL continues to increase with time when non-zero pressure signals are present. It therefore can be construed as a dose-type measurement, so the integration time used must be carefully considered in terms of relevance for impact to the exposed recipients.

SEL can be calculated over periods with multiple acoustic events or over a fixed duration. For a fixed duration, the square pressure is integrated over the duration of interest. For multiple events, SEL can be computed by summing (in linear units) SEL of the N individual events:

$$L_{E,N} = 10\log_{10}\left(\sum_{i=1}^{N} 10^{\frac{L_{E,i}}{10}}\right). \tag{A-3}$$

Appendix B. Methods and Parameters

This section describes the specifications of the seismic source that was used at all sites and the environmental parameters used in the propagation models.

B.1. Estimating Range to Thresholds Levels

Sound level contours were calculated based on the underwater sound fields predicted by the propagation models, sampled by taking the maximum value over all modelled depths above the sea floor for each location in the modelled region. The predicted distances to specific levels were computed from these contours. Two distances relative to the source are reported for each sound level: 1) R_{max}, the maximum range to the given sound level over all azimuths, and 2) $R_{95\%}$, the range to the given sound level after the 5% farthest points were excluded (see examples in Figure B-1).

The $R_{95\%}$ is used because sound field footprints are often irregular in shape. In some cases, a sound level contour might have small protrusions or anomalous isolated fringes. This is demonstrated in the image in Figure B-1(a). In cases such as this, where relatively few points are excluded in any given direction, R_{max} can misrepresent the area of the region exposed to such effects, and $R_{95\%}$ is considered more representative. In strongly asymmetric cases such as shown in Figure B-1(b), on the other hand, $R_{95\%}$ neglects to account for significant protrusions in the footprint. In such cases R_{max} might better represent the region of effect in specific directions. Cases such as this are usually associated with bathymetric features affecting propagation. The difference between R_{max} and $R_{95\%}$ depends on the source directivity and the non-uniformity of the acoustic environment.

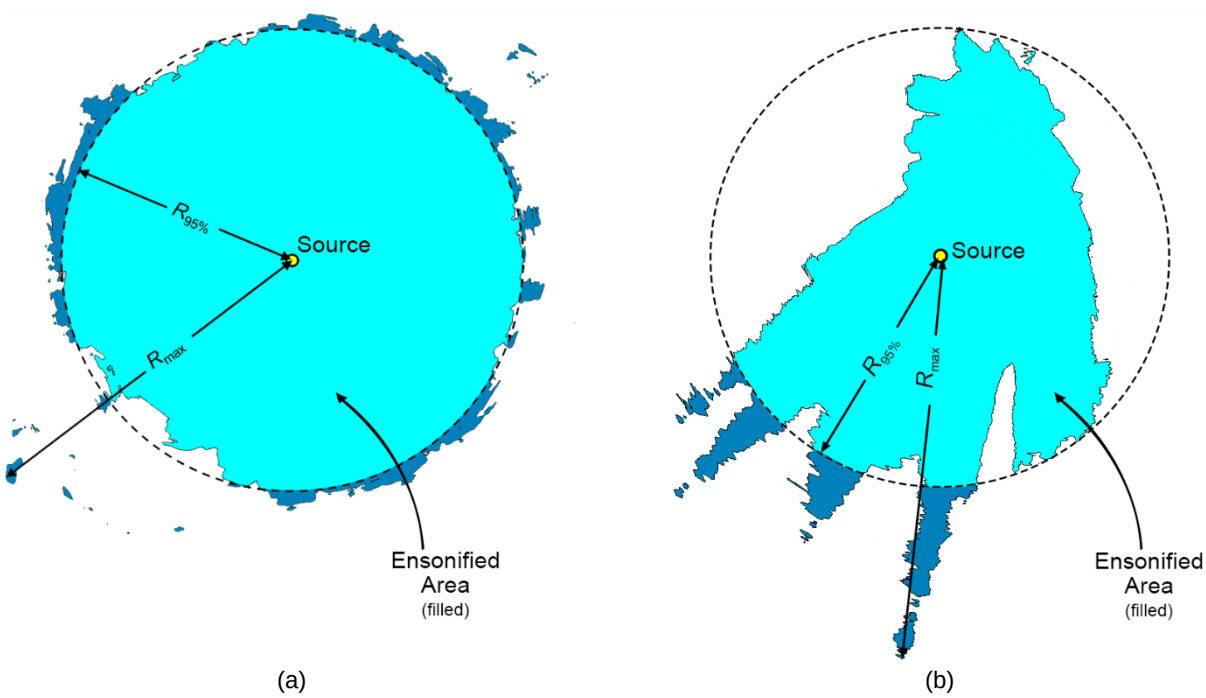

Figure B-1. Sample areas ensonified to an arbitrary sound level with R_{max} and $R_{95\%}$ ranges shown for two different scenarios. (a) Largely symmetric sound level contour with small protrusions. (b) Strongly asymmetric sound level contour with long protrusions. Light blue indicates the ensonified areas bounded by $R_{95\%}$; darker blue indicates the areas outside this boundary which determine R_{max}.

B.2. Environmental Parameters

B.2.1. Bathymetry

Water depths throughout the modelled areas were extracted from the Australian Bathymetry and Topography Grid, a 9 arc-second grid rendered for Australian waters (Whiteway 2009). Bathymetry data were re-gridded onto a Map Grid of Australia (MGA) coordinate projection (Zone 54) with a regular grid spacing of 100 × 100 m.

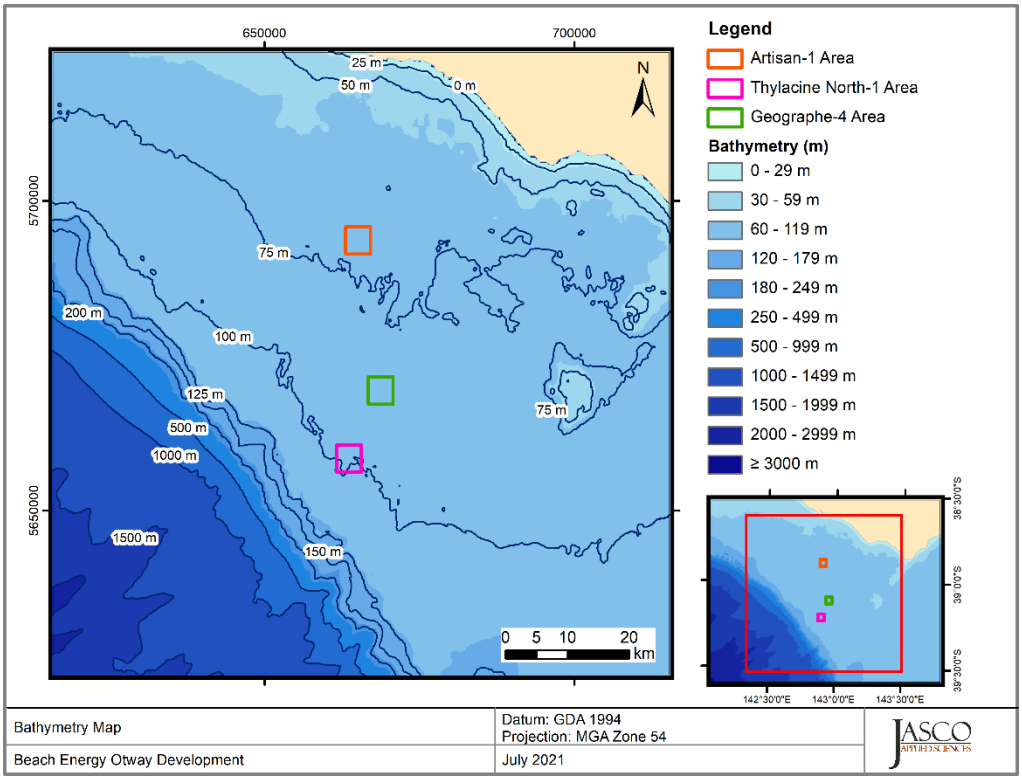

Figure B-2. Bathymetry in the modelled area.

B.2.2. Sound speed profile

The sound speed profile in the area was derived from temperature and salinity profiles from the U.S. Naval Oceanographic Office's *Generalized Digital Environmental Model V 3.0* (GDEM; Teague et al. 1990, Carnes 2009). GDEM provides an ocean climatology of temperature and salinity for the world's oceans on a latitude-longitude grid with 0.25° resolution, with a temporal resolution of one month, based on global historical observations from the U.S. Navy's Master Oceanographic Observational Data Set (MOODS). The climatology profiles include 78 fixed depth points to a maximum depth of 6800 m (where the ocean is that deep). The GDEM temperature-salinity profiles were converted to sound speed profiles according to Coppens (1981).

Mean monthly sound speed profiles were derived from the GDEM profiles at distances less than 7 km around the modelled site. The June sound speed profile is expected to be most favourable to longer-range sound propagation across the entire year. As such, June was selected for sound propagation modelling to ensure precautionary estimates of distances to received sound level thresholds. For the pygmy blue whale period between November and January November is expected to be most favourable to longer-range propagation in that period. Figure B-3 shows the resulting profiles, which were used as input to the sound propagation modelling.

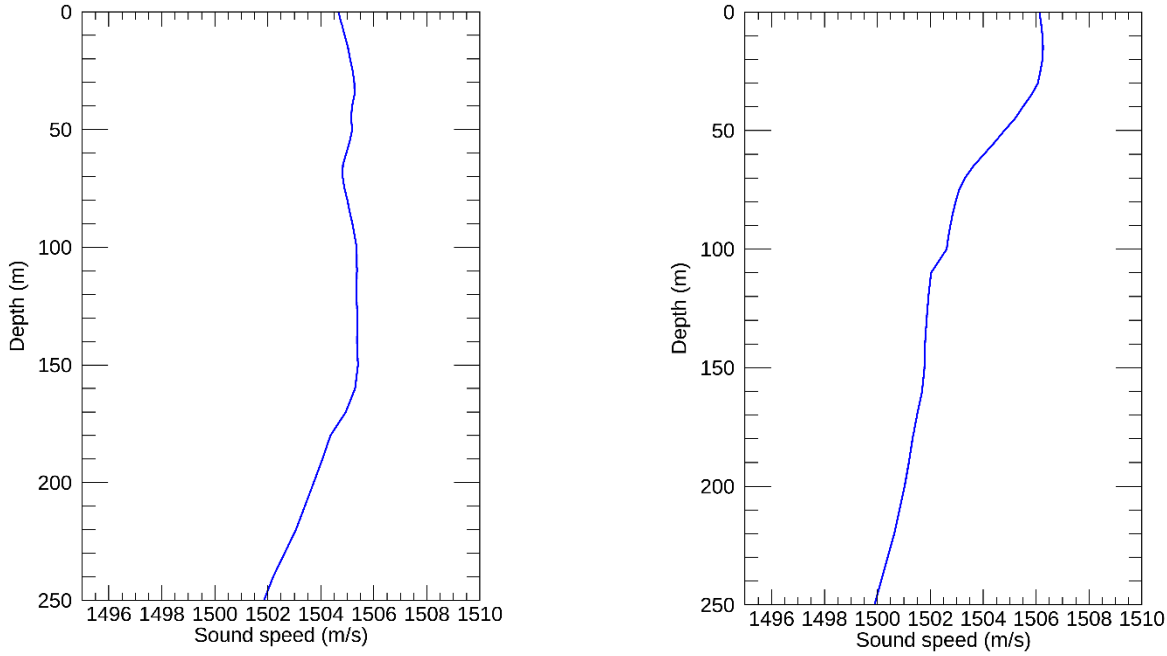

Figure B-3. The modelling sound speed profile corresponding to June (left) and November (right) Profiles are calculated from temperature and salinity profiles from *Generalized Digital Environmental Model* V 3.0 (GDEM; Teague et al. 1990, Carnes 2009).

B.2.3. Geoacoustics

The propagation model used in this study consider a single geoacoustic profile for each development area. These profiles determine how sound is reflected from the seabed, as well as how it is transmitted, reflected and absorbed into the sediment layers. As in previous acoustic studies in the area, the modelling area was divided into two seabed types (Wood and McPherson 2018). Both areas are located on the continental shelf, however the seabed in the Thylacine North-1 and were modelled as being characterised by well-cemented carbonate caprock (calcarenite), overlying semi-cemented carbonate rock (calcarenite). This contrast in seabed environment is consistent with larger scale geological data and interpretations of the Australian continental shelf environment (James and Bone 2010). Table B-1 present the geoacoustic profile used at the modelled sites in each respective development area.

Table B-1. *Thylacine North-1*: Geoacoustic profile. Each parameter varies linearly within the stated range.

Depth below seafloor (m)	Predicted lithology	Density (g/cm³)	Compressional wave		Shear wave	
			Speed (m/s)	Attenuation (dB/λ)	Speed (m/s)	Attenuation (dB/λ)
0–0.5	Well-cemented carbonate caprock	2.7	2600	0.50	1200	0.5
0.5–20	Increasingly cemented calcarenite	2.2	2000	0.30	900	0.27
20-40		2.3	2120	0.34	960	0.32
40-60		2.4	2240	0.38	1020	0.41
60-80		2.5	2360	0.42	1080	0.45
80–100		2.6	2480	0.46	1140	0.5
>100	Well-cemented calcarenite	2.7	2600	0.5	1200	0.5

G.3 Beach Otway Project Additional Modelling at Well Location South (Connell and Koessler 2023)

Technical Memo

DATE: 11 December 2023

DOCUMENT: 03248 Version 1.0

FROM: Steven Connell, Matthew Koessler (JASCO Applied Sciences (Australia) Pty Ltd)

TO: Glen Nicholson (Beach Energy)

Subject: Beach Otway Project, Additional Modelling at Well Location South

JASCO Applied Sciences (JASCO) performed additional modelling of underwater sound levels associated with the Beach Energy's exploration, development, and operations within the Otway basin. This study supplements work conducted to date, including drilling and construction results previously presented in Koessler and McPherson (2021), Koessler et al. (2020), Matthews et al. (2020) and Matthews et al. (2021). Additional modelling results have been added to better represent the southern part of the development area at a representative southern well location. In this report location is referred to as "Well Location South".

Estimated underwater acoustic levels are presented as sound pressure levels (SPL, L_p), and as accumulated sound exposure levels (SEL, L_E) as appropriate for non-impulsive (continuous) noise sources. For the non-time dependent scenarios, marine mammal behavioural threshold based on the current interim NOAA (2019) criterion for marine mammals of 120 dB re 1 µPa (SPL; L_p) for non-impulsive sound sources are summarised in Section 2.

For the time-dependent scenarios, the modelled maximum distances to permanent threshold shift (PTS) and temporary threshold shift (TTS) criteria for low-frequency cetaceans Southall et al. (2019)., which are based on SEL accumulated over a period of time are summarised in Section 2.

Summary tables of results are provided in Table 1 and 2 below.

Table 1. Maximum (R_{max}) horizontal distances (in km) to sound pressure level (SPL) for the NOAA (2019) behavioural response threshold from the most appropriate location for considered sources per scenario. OSV: Offshore Supply Vessel, MODU: Mobile Offshore Drilling Unit

Scenario number	Well Area	Description	R_{max} (km)
1	Well Location South	MODU Drilling	1.46
2		OSV under Transit	0.41
3		MODU Drilling + OSV under DP (4hr) + OSV under Transit (20hr) (Resupply Ops)	19.6
4		MODU Drilling + OSV under Transit	2.21

Table 2. Summary: Maximum (R_{max}) horizontal distances (in km) for the frequency-weighted LF-cetacean SEL_{24h} TTS thresholds based on Southall et al. (2019) from the most appropriate location for considered sources per scenario. OSV: Offshore Supply Vessel, MODU: Mobile Offshore Drilling Unit

Scenario number	Well Area	Description	R_{max} (km)
1	Well Location South	MODU Drilling	0.23
2		OSV under Transit	0.01
3		MODU Drilling + OSV under DP (4hr) + OSV under Transit (20hr) (Resupply Ops)	1.48
4		MODU Drilling + OSV under Transit	0.23

1. Acoustic Modelling Scenario Details

The modelled sites considered within this additional modelling are provided in Table 3, with the associated modelled scenarios detailed below and provided in Table 4. An overview of the considered scenarios is as follows:

1. MODU Drilling at Well Location South.
2. OSV vessel on standby in a 2x4 km box 2 km east of Well Location South for 24 hours.
3. MODU drilling at Well Location South with OSV under DP alongside MODU performing resupply for 4 hours and OSV vessel on standby in a 2x4 km box 2 km east of Well Location South for 20 hours.
4. MODU drilling at Well Location South with OSV vessel on standby in a 2x4 km box 2 km east of Well Location South for 24 hours.

Table 3. Location details for the modelled sites. OSV: Offshore Supply Vessel, MODU: Mobile Offshore Drilling Unit.

Well	Site	Source	Latitude (S)	Longitude (E)	MGA (GDA94), Zone 54		Water depth (m)
					X (m)	Y (m)	
Well Location South	1	MODU	39° 44' 54.61"	143° 09' 49.54"	685382	5597917	156
	2	OSV (DP)	39° 44' 54.56"	143° 09' 52.23"	685446	5597917	156
	3	OSV (transit)	39° 44' 53.04"	143° 11' 13.52"	687382	5597917	136

Table 4. Description of modelled scenarios, OSV: Offshore Supply Vessel, MODU: Mobile Offshore Drilling Unit.

Scenario	Site	Location	Operation Description
1	1	Well Location South	MODU Drilling
2	3		OSV under Transit
3	1,2,3		MODU Drilling + OSV under DP (4 hr) + OSV under Transit (20 hr) (Resupply Ops)
4	1,3		MODU Drilling + OSV under Transit

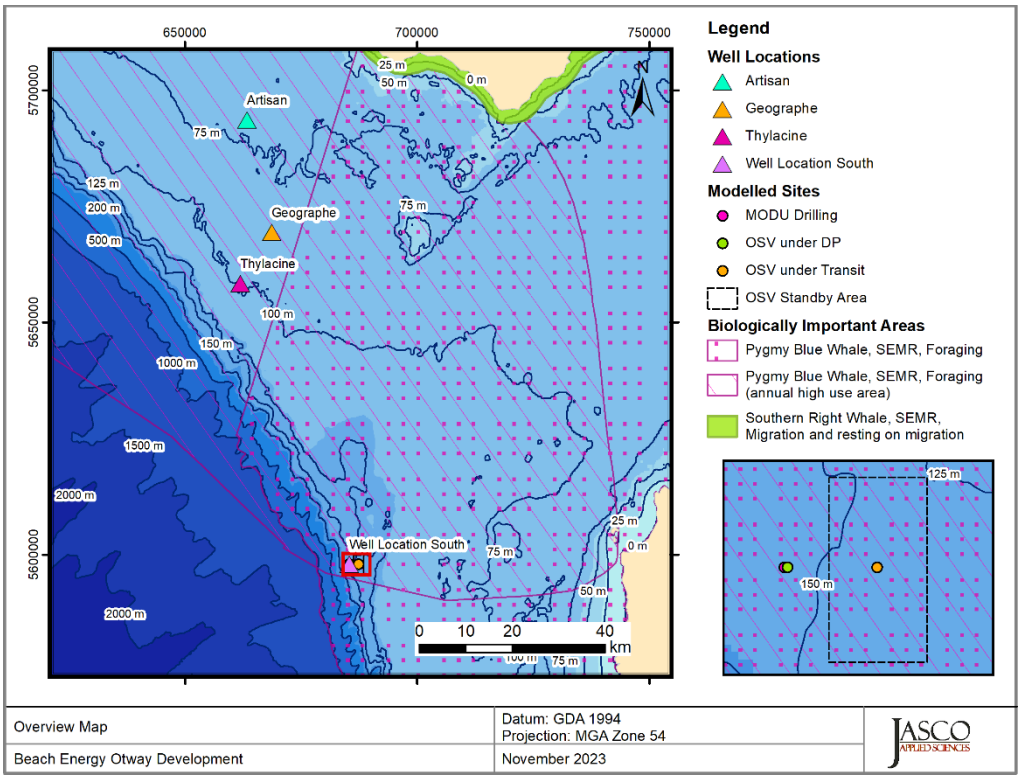

Figure 1. Overview map of the Beach Otway development area.

2. Noise Effect Criteria

To assess the potential effects of a sound-producing activity, it is necessary to establish exposure criteria (thresholds) for which sound levels may be expected to have a negative effect on animals. Whether acoustic exposure levels might injure or disturb marine fauna is an active research topic. Since 2007, several expert groups have developed SEL-based assessment approaches for evaluating auditory injury, with key works including Southall et al. (2007), Finneran and Jenkins (2012), Popper et al. (2014), United States National Marine Fisheries Service (NMFS 2018) and Southall et al. (2019). The number of studies that investigate the level of behavioural disturbance to marine fauna by anthropogenic sound has also increased substantially.

Two sound level metrics, SPL, and SEL, are commonly used to evaluate non-impulsive noise and its effects on marine life. In this report, the duration of the SEL accumulation is defined as integrated over a 24 h time period. Appropriate subscripts indicate any applied frequency weighting applied. The acoustic metrics in this report reflect the updated ANSI and ISO standards for acoustic terminology, ANSI S1.1 (2013) and ISO 18405:2017 (2017).

The following thresholds and guidelines for this study were chosen because they represent the best available science, and sound levels presented in literature for fauna with no defined thresholds:

1. Frequency-weighted accumulated sound exposure levels (SEL; $L_{E,24h}$) from Southall et al. (2019) for the onset of permanent threshold shift (PTS) and temporary threshold shift (TTS) in marine mammals for non-impulsive sources.
2. Marine mammal behavioural threshold based on the current interim U.S. National Oceanic and Atmospheric Administration (NOAA) (2019) criterion for marine mammals of 120 dB re 1 µPa (SPL; L_p) for non-impulsive sound sources.

3. Sound exposure guidelines for fish, fish eggs, and larvae (Popper et al. 2014).
4. Frequency-weighted accumulated sound exposure levels (SEL; $L_{E,24h}$) from Finneran et al. (2017) for the onset of PTS and TTS in turtles for non-impulsive sources.

Additional detail on thresholds, guidelines and weighting functions can be found in Koessler et al. (2020), Matthews et al. (2020) and Matthews et al. (2021).

3. Methods

For a detailed description of the employed modelling method and input parameters refer to Koessler et al. (2020), Matthews et al. (2020), Matthews et al. (2021), Connell et al. (2021) and McPherson et al. (2021). The environmental parameters used in the propagation models are described in Appendix B.2. An analysis of seasonal sound speed profiles in Koessler and McPherson (2021) indicated that June was the month most conducive to sound propagation and was chosen for modelling. Modelling also accounted for site-specific bathymetric variations (see Appendix B.2.1) and local geoacoustic properties (see Appendix B.2.3).

3.1. Vessel and MODU Noise Sources

The MODU drilling and OSV under DP and on transit was based on measurements sourced from McPherson et al. (2021). The MODU was the *Ocean Onyx* and the loudest drill measurement was chosen while the OSV was the *Siem Sapphire*. For vessel details see Koessler et al. (2020) while a brief a summary of the measured source levels and spectra for the MODU and OSV used here are provided as follows:

- For the MODU drilling, mean levels from Section 5.5.1 in McPherson et al. (2021) were used.
- For scenarios where the OSV was under dynamic positioning (DP) the average spectrum from Section 5.5.2 in McPherson et al. (2021) was used.
- For scenarios where the OSV was transiting or standing by the average slow transit (7 knots) spectrum in McPherson et al. (2021) was used.

Figure 2 presents a summary plot of considered source spectra.

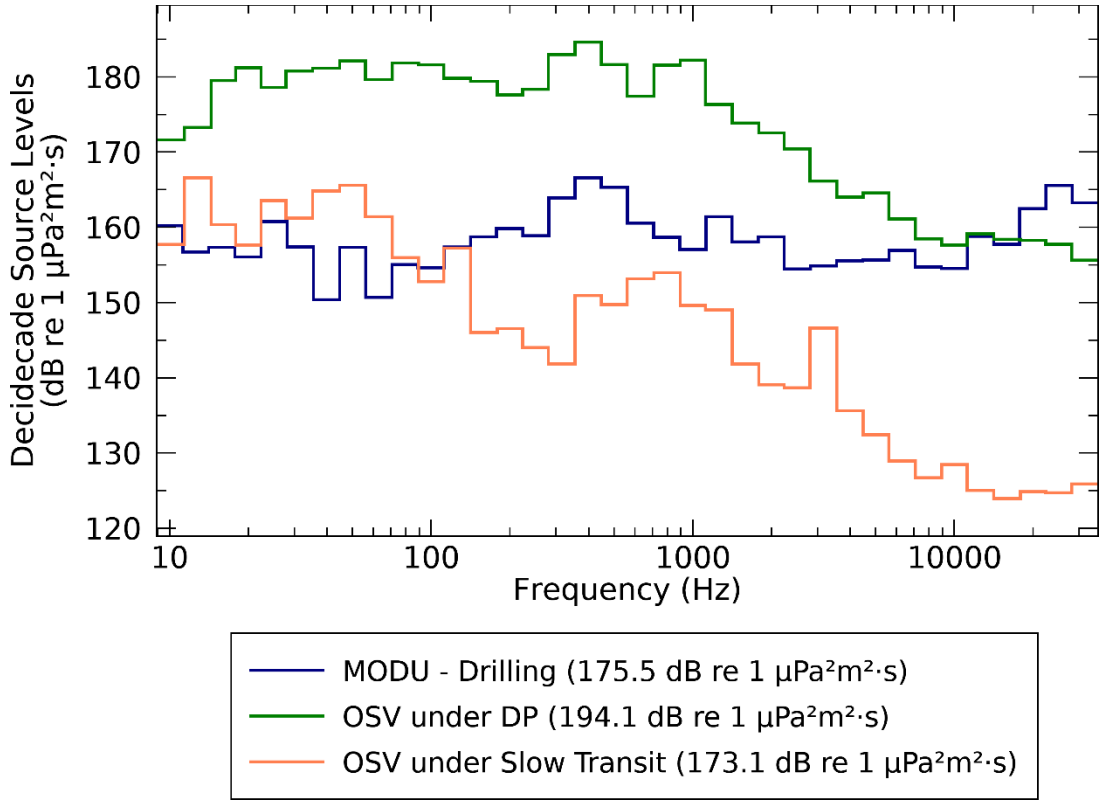

Figure 2. Energy source level (ESL) spectra (in decidecade frequency-band) for all sound sources.

4. Results

Results below are presented in two forms, tables of distances to isopleth contours (Section 4.1) and sound footprint maps (Section 4.2).

4.1. Tabulated Results

Table 5. *All Scenarios:* Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) to sound pressure level (SPL) from the most appropriate location for considered sources per scenario. A dash indicates the level was not reached within the limits of the modelling resolution (20 m). OSV: Offshore Supply Vessel, DP: Dynamic Positioning, MODU: Mobile Offshore Drilling Unit.

SPL (L_p; dB re 1 µPa)	Scenario 1 MODU Drilling		Scenario 2 OSV under Transit		Scenario 3 MODU Drilling + OSV under DP + OSV under Transit		Scenario 4 MODU Drilling + OSV under Transit	
	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)
180	–	–	–	–	0.02	0.02	–	–
170[A]	–	–	–	–	0.02	0.02	–	–
160	–	–	–	–	0.09	0.09	–	–
158[B]	–	–	–	–	0.11	0.11	–	–
150	0.02	0.02	–	–	0.23	0.22	0.02	0.02
140	0.07	0.07	0.03	0.03	1.21	1.07	0.07	0.07
130	0.25	0.24	0.09	0.09	5.77	4.76	0.25	0.24
120[C]	1.46	1.26	0.41	0.40	19.6	15.4	2.21	2.02
110	7.24	6.36	1.69	1.54	64.3	45.8	7.84	6.40

[A] 48 h threshold for recoverable injury for fish with a swim bladder involved in hearing (Popper et al. 2014).
[B] 12 h threshold for TTS for fish with a swim bladder involved in hearing (Popper et al. 2014).
[C] Threshold for marine mammal behavioural response to continuous noise from NOAA (2019).

Table 6. *All Scenarios:* Maximum (R_{max}) horizontal distances (in km) to frequency-weighted SEL_{24h} PTS and TTS thresholds based on Southall et al. (2019) and Finneran et al. (2017) from the most appropriate location for considered sources per scenario, and ensonified area (km²). A dash indicates the level was not reached within the limits of the modelling resolution (20 m). A slash indicates that the area is less than an area associated with the modelled resolution (0.0013 km²). OSV: Offshore Supply Vessel, DP: Dynamic Positioning, MODU: Mobile Offshore Drilling Unit.

Hearing group	Frequency-weighted SEL_{24h} threshold ($L_{E,24h}$; dB re 1 µPa²·s)	Scenario 1 MODU Drilling		Scenario 2 OSV under Transit		Scenario 3 MODU Drilling + OSV under DP + OSV under Transit		Scenario 4 MODU Drilling + OSV under Transit	
		R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)
PTS									
Low-Frequency (LF) cetaceans	199	–	–	–	–	0.10	0.02	–	–
High-frequency (HF) cetaceans	198	–	–	–	–	0.05	/	–	–
Very High-frequency (VHF) cetaceans	173	0.13	0.06	–	–	0.17	0.07	0.13	0.06
Otariid seals	219	–	–	–	–	0.03	/	–	–
Turtles	220	–	–	–	–	0.05	/	–	–
TTS									
Low-Frequency (LF) cetaceans	179	0.23	0.16	0.01	0.11	1.48	5.10	0.23	0.28
High-frequency (HF) cetaceans	178	0.09	0.02	–	–	0.12	0.03	0.09	0.02
Very High-frequency (VHF) cetaceans	153	1.43	5.97	0.01	0.11	1.53	6.87	1.44	6.08
Otariid seals	199	–	–	–	–	0.05	/	–	–
Turtles	200	–	–	–	–	0.08	0.01	–	–

4.2. Sound Field Maps

Maps of the estimated sound fields, threshold contours, and isopleths of interest for SPL (Section 4.2.1) and SEL_{24h} (Section 4.2.2) sound fields are presented below.

4.2.1. SPL Maps

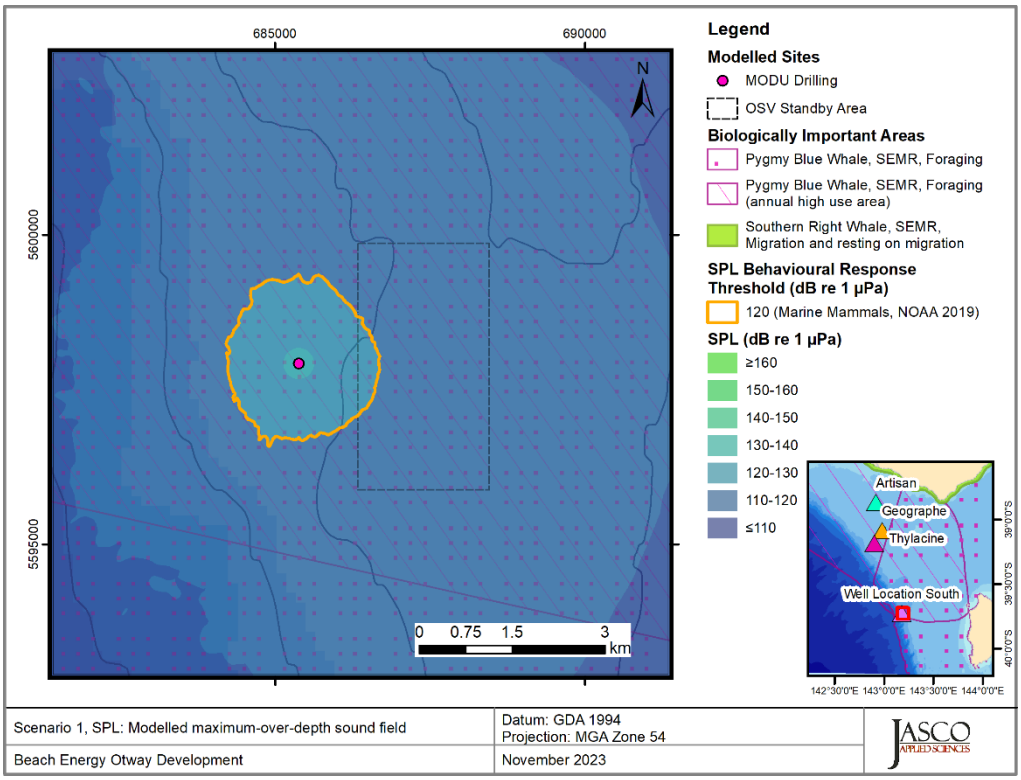

Figure 3. *Well Location South, MODU Drilling*, SPL: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals.

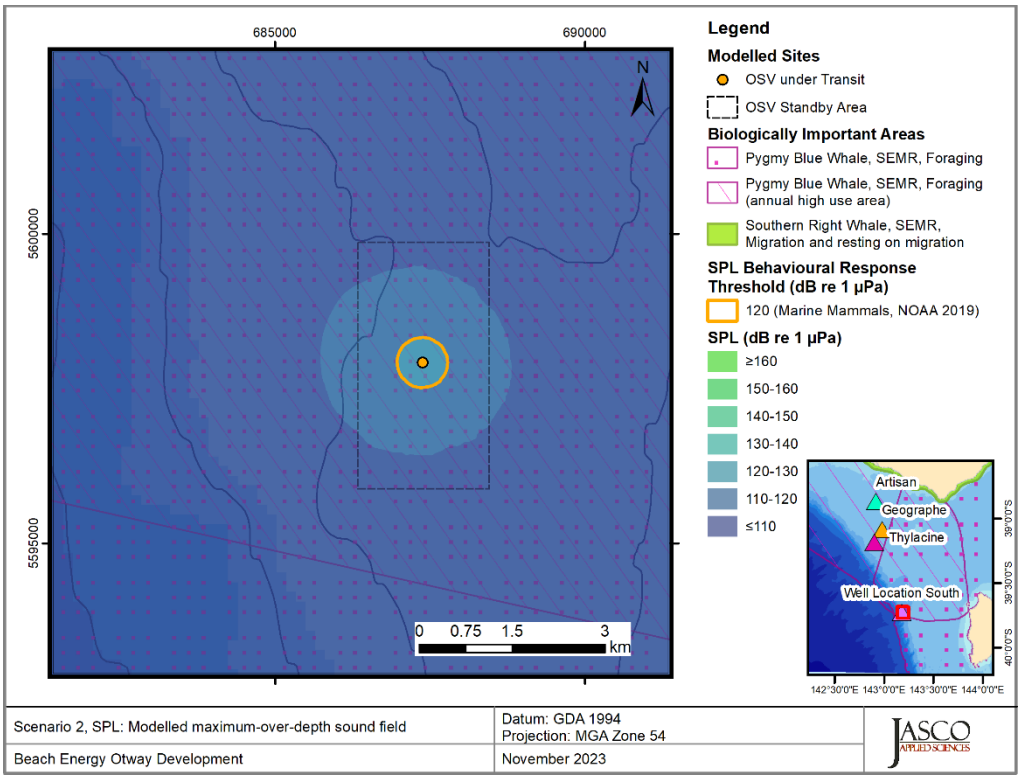

Figure 4. *Well Location South, OSV under Transit*, SPL: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals.

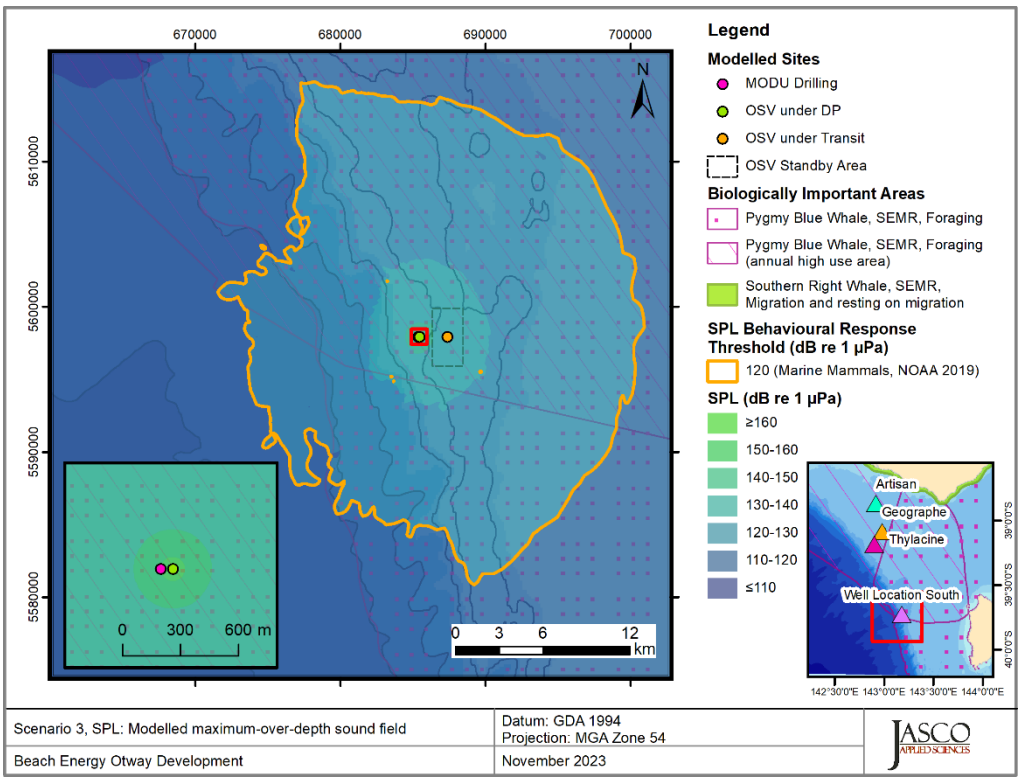

Figure 5. *Well Location South, MODU Drilling, OSV under DP, and OSV under Transit*, SPL: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals.

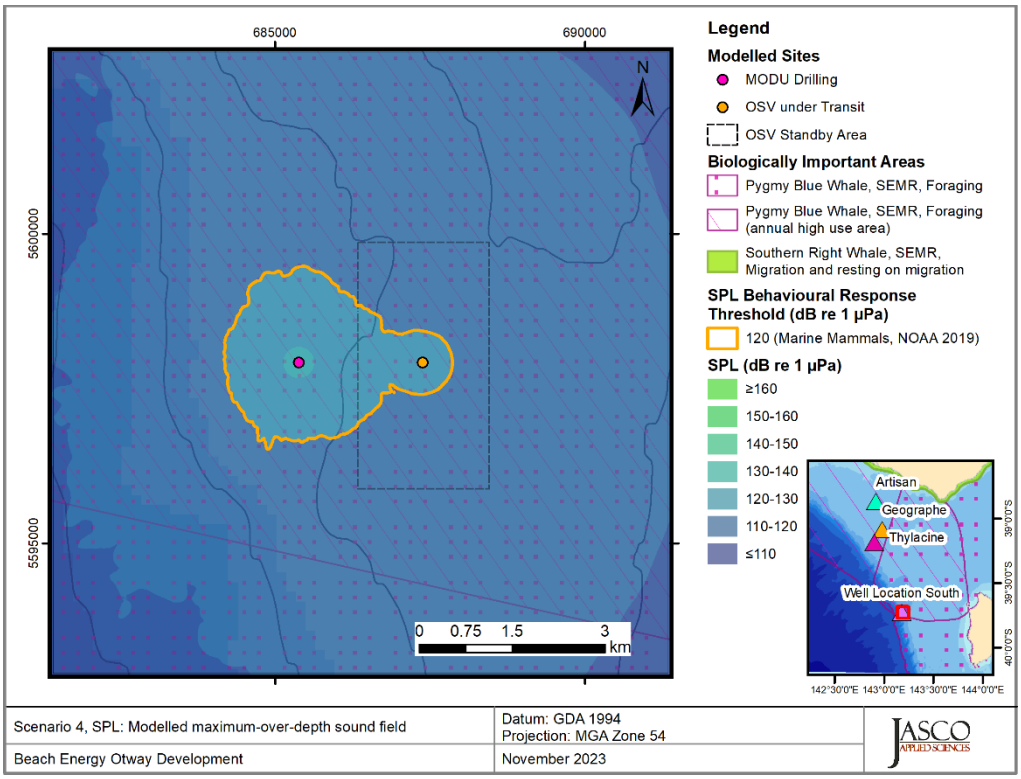

Figure 6. *Well Location South, MODU Drilling and OSV under transit*, SPL: Sound level contour map of unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural response thresholds for marine mammals.

4.2.2. Accumulated SEL_{24h} Maps

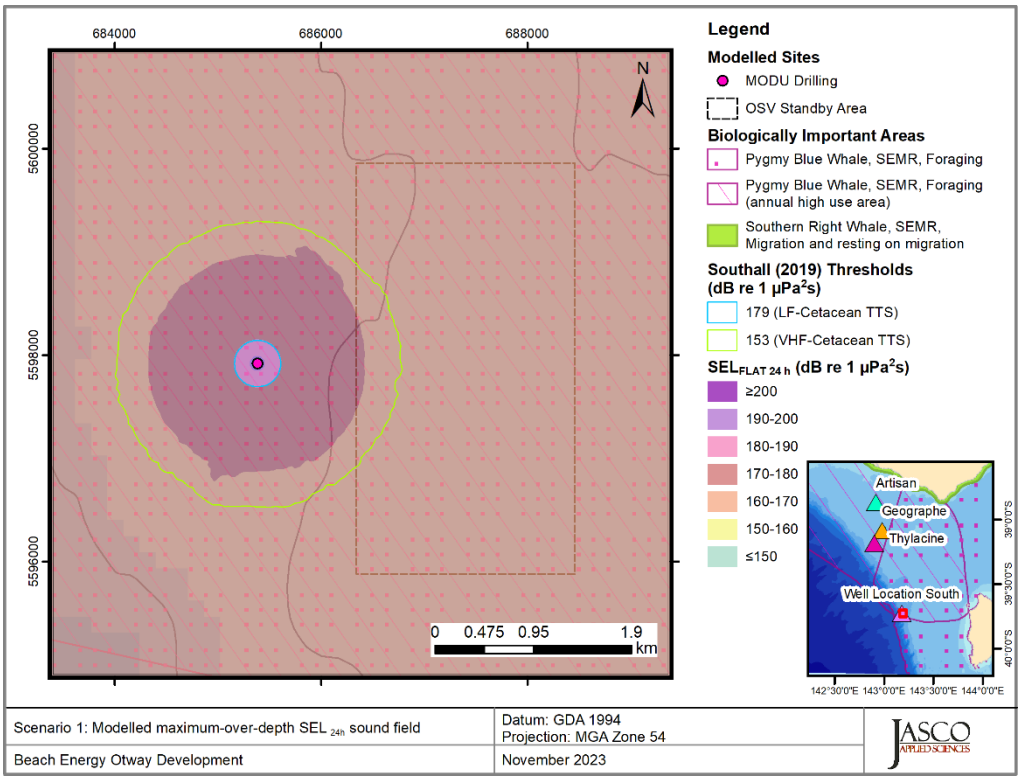

Figure 7. *Well Location South, MODU Drilling*, sound level contour map of unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such they could not be displayed on a map.

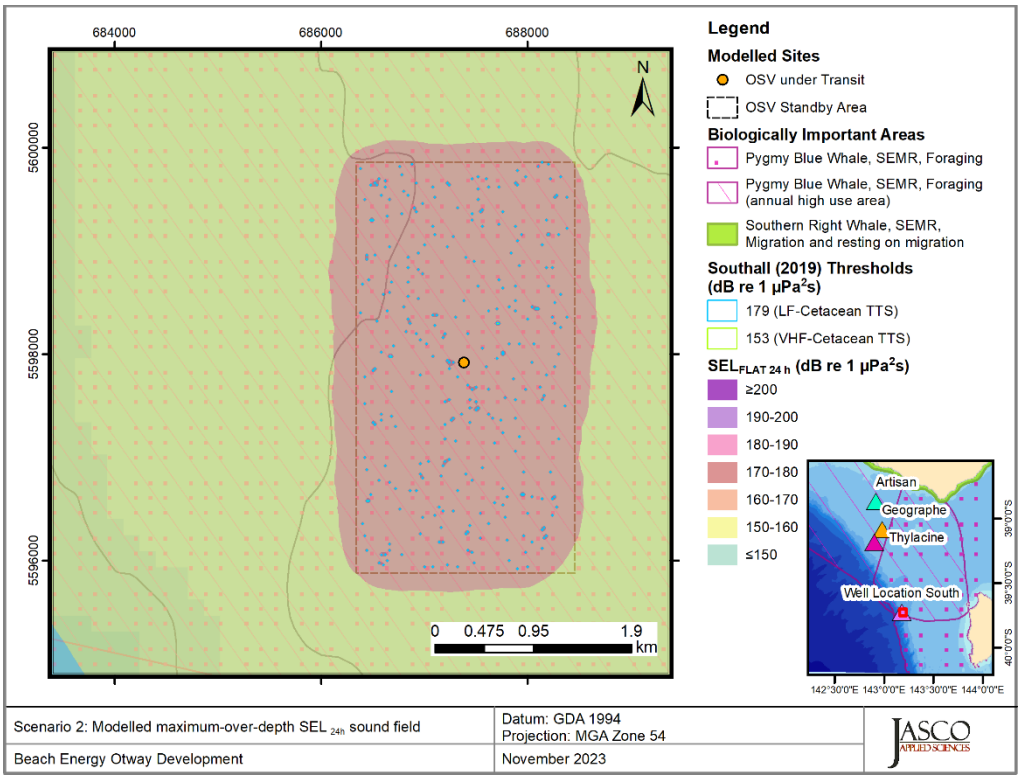

Figure 8. *Well Location South, OSV under Transit*, sound level contour map of unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such they could not be displayed on a map.

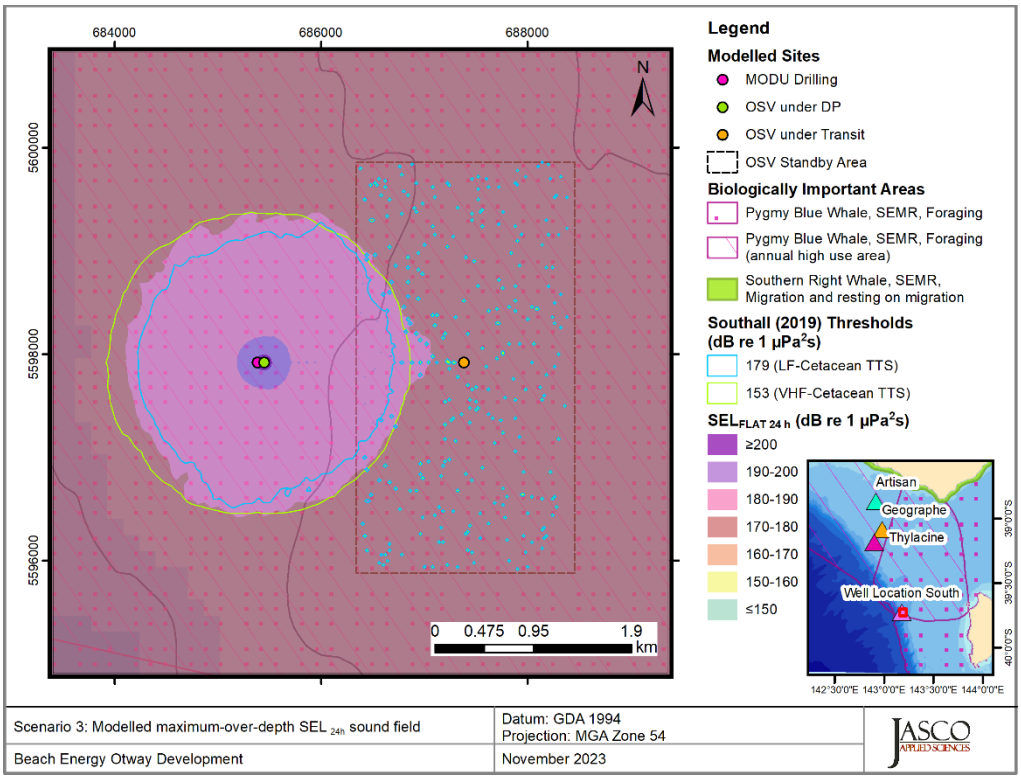

Figure 9. *Well Location South, MODU Drilling, OSV under DP (4h), and OSV under Transit (20h)*, sound level contour map of unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such they could not be displayed on a map.

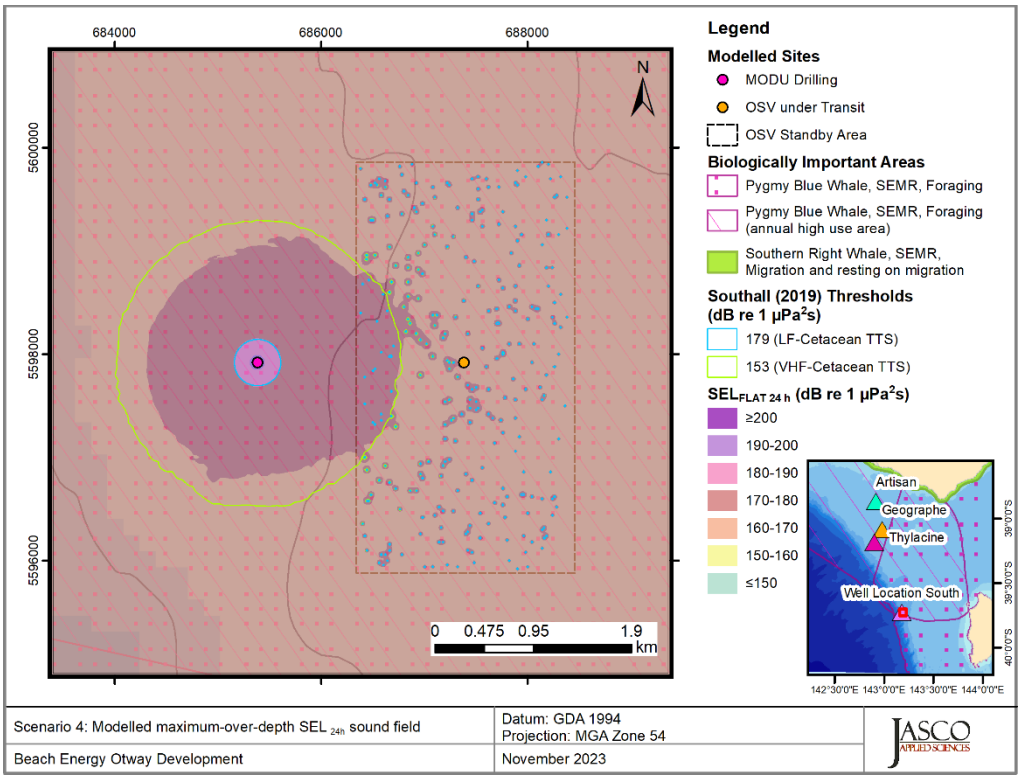

Figure 10. *Well Location South, MODU Drilling and OSV under transit*, sound level contour map of unweighted maximum-over-depth SEL_{24h} results, along with isopleths for TTS thresholds. Thresholds for PTS and some thresholds for TTS were either not reached or were small enough such they could not be displayed on a map.

Glossary

1/3-octave

One third of an octave. *Note*: A 1/3-octave is approximately equal to one decidecade (1/3 oct ≈ 1.003 ddec).

absorption

The conversion of sound energy to heat energy. Specifically, the reduction of sound pressure amplitude due to particle motion energy converting to heat in the propagation medium.

acoustic noise

Sound that interferes with an acoustic process.

acoustic self-noise

Sound at a receiver caused by the deployment, operation, or recovery of a specified receiver, and its associated platform (ISO 18405:2017).

ambient sound

Sound that would be present in the absence of a specified activity (ISO 18405:2017). It is usually a composite of sound from many sources near and far, e.g., shipping vessels, seismic activity, precipitation, sea ice movement, wave action, and biological activity.

attenuation

The gradual loss of acoustic energy from absorption and scattering as sound propagates through a medium. Attenuation depends on frequency—higher frequency sounds are attenuated faster than lower frequency sounds.

auditory frequency weighting

The process of applying an auditory frequency-weighting function. An example for marine mammals are the auditory frequency-weighting functions published by Southall et al. (2007).

auditory frequency-weighting function

Frequency-weighting function describing a compensatory approach accounting for a species' (or functional hearing group's) frequency-specific hearing sensitivity.

background noise

Combination of ambient sound, acoustic self-noise, and, where applicable, sonar reverberation (ISO 18405:2017) that is detected, measured, or recorded with a signal.

bandwidth

A range within a continuous band of frequencies. Unit: hertz (Hz).

broadband level

The total level measured over a specified frequency range. If the frequency range is unspecified, the term refers to the entire measured frequency range.

cavitation

A rapid formation and collapse of vapor cavities (i.e., bubbles or voids) in water, most often caused by a rapid change in pressure. Fast-spinning vessel propellers typically cause cavitation, which creates a lot of noise.

cetacean

Member of the order Cetacea. Cetaceans are aquatic mammals and include whales, dolphins, and porpoises.

compressional wave

A mechanical vibration wave in which the direction of particle motion is parallel to the direction of propagation. Also called a longitudinal wave. In seismology/geophysics, it's called a primary wave or P-wave. Shear waves in the seabed can be converted to compressional waves in water at the water-seabed interface.

continuous sound

A sound whose sound pressure level remains above the **background noise** during the observation period and may gradually vary in intensity with time, e.g., sound from a marine vessel.

decade

Logarithmic frequency interval whose upper bound is ten times larger than its lower bound (ISO 80000-3:2006). For example, one decade up from 1000 Hz is 10,000 Hz, and one decade down is 100 Hz.

decibel (dB)

Unit of level used to express the ratio of one value of a power quantity to another on a logarithmic scale. Especially suited to quantify variables with a large dynamic range.

decidecade

One tenth of a decade. Approximately equal to one third of an octave (1 ddec ≈ 0.3322 oct), and for this reason sometimes referred to as a 1/3-octave.

decidecade band

Frequency band whose bandwidth is one decidecade. *Note*: The bandwidth of a decidecade band increases with increasing centre frequency.

energy source level

A property of a sound source equal to the sound exposure level measured in the far field plus the propagation loss from the acoustic centre of the source to the receiver position. Unit: decibel (dB). Reference value: 1 $\mu Pa^2\ m^2\ s$.

ensonified

Exposed to sound.

far field

The zone where, to an observer, sound originating from an array of sources (or a spatially distributed source) appears to radiate from a single point.

frequency

The rate of oscillation of a periodic function measured in cycles per unit time. The reciprocal of the period. Unit: hertz (Hz). Symbol: f. 1 Hz is equal to 1 cycle per second.

frequency weighting

The process of applying a frequency-weighting function.

frequency-weighting function

The squared magnitude of the sound pressure transfer function (ISO 18405:2017). For sound of a given frequency, the frequency-weighting function is the ratio of output power to input power of a specified filter, sometimes expressed in decibels. Examples include the following:

- *Auditory frequency-weighting function*: compensatory frequency-weighting function accounting for a species' (or functional hearing group's) frequency-specific hearing sensitivity.
- *System frequency-weighting function*: frequency-weighting function describing the sensitivity of an acoustic recording system, which typically consists of a hydrophone, one or more amplifiers, and an analog-to-digital converter.

functional hearing group

Category of animal species when classified according to their hearing sensitivity, hearing anatomy, and susceptibility to sound. For marine mammals, initial groupings were proposed by Southall et al. (2007), and revised groupings are developed as new research/data becomes available. Revised groupings proposed by Southall et al. (2019) include low-frequency cetaceans, high-frequency cetaceans, very high-frequency cetaceans, phocid carnivores in water, other carnivores in water, and sirenians. See auditory frequency-weighting functions, which are often applied to these groups. Example hearing groups for fish include species for which the swim bladder is involved in hearing, species for which the swim bladder is not involved in hearing, and species without a swim bladder (Popper et al. 2014).

geoacoustic

Relating to the acoustic properties of the seabed.

hearing threshold

For a given species or functional hearing group, the sound level for a given signal that is barely audible (i.e., that would be barely audible for a given individual in the presence of specified **background noise** during a specific percentage of experimental trials).

hertz (Hz)

Unit of frequency defined as one cycle per second. Often expressed in multiples such as kilohertz (1 kHz = 1000 Hz).

high-frequency (HF) cetaceans

See functional hearing group. *Note*: The mid- and high-frequency cetaceans groups proposed by Southall et al. (2007) were renamed high- and very-high-frequency cetaceans, respectively, by Southall et al. (2019).

hydrophone

An underwater sound pressure transducer. A passive electronic device for recording or listening to underwater sound.

hydrostatic pressure

The pressure at any given depth in a static liquid that is the result of the weight of the liquid acting on a unit area at that depth, plus any pressure acting on the surface of the liquid. Unit: pascal (Pa).

impulsive sound

Qualitative term meaning sounds that are typically transient, brief (less than 1 s), broadband, with rapid rise time and rapid decay. They can occur in repetition or as a single event. Sources of impulsive sound include, among others, explosives, seismic airguns, and impact pile drivers.

isopleth

A line drawn on a map through all points having the same value of some specified quantity (e.g., sound pressure level isopleth).

knot (kn)

Unit of vessel speed equal to 1 nautical mile per hour.

level

A measure of a quantity expressed as the logarithm of the ratio of the quantity to a specified reference value of that quantity. For example, a value of sound pressure level with reference to 1 μPa^2 can be written in the form *x* dB re 1 μPa^2.

low-frequency (LF) cetaceans

See functional hearing group.

median

The 50th percentile of a statistical distribution.

mid-frequency (MF) cetaceans

See functional hearing group. *Note*: The mid-frequency cetaceans group proposed by Southall et al. (2007) was renamed high-frequency cetaceans by Southall et al. (2019).

monopole source level (MSL)

A source level that has been calculated using an acoustic model that accounts for the effect of the sea-surface and seabed on sound propagation, assuming a point source (monopole). Often used to quantify source levels of vessels or industrial operations from measurements. See also radiated noise level.

M-weighting

A set of auditory frequency-weighting functions proposed by Southall et al. (2007).

mysticete

Member of the Mysticeti, a suborder of cetaceans. Also known as baleen whales, mysticetes have baleen plates (rather than teeth) that they use to filter food from water (or from sediment as for grey whales). This group includes rorquals (Balaenopteridae, such as blue, fin, humpback, and minke whales), right and bowhead whales (Balaenidae), and grey whales (*Eschrichtius robustus*).

non-impulsive sound

Sound that is not an impulsive sound. Not necessarily a continuous sound.

octave

The interval between a sound and another sound with double or half the frequency. For example, one octave above 200 Hz is 400 Hz, and one octave below 200 Hz is 100 Hz.

odontocete

Member of Odontoceti, a suborder of cetaceans. These whales, dolphins, and porpoises have teeth (rather than baleen plates). Their skulls are mostly asymmetric, an adaptation for their echolocation. This group includes sperm whales, killer whales, belugas, narwhals, dolphins, and porpoises.

otariid

Member of the family Otariidae, one of the three groupings of pinnipeds (along with phocids and walrus). These eared seals, commonly called fur seals and sea lions, are adapted to semi-aquatic life; they use their large fore flippers for propulsion underwater and can walk on all four limbs on land.

otariid pinnipeds underwater (OW)

See functional hearing group.

other marine carnivores in water (OCW)

See functional hearing group.

parabolic equation method

A computationally efficient solution to the acoustic wave equation that is used to model propagation loss. The parabolic equation approximation omits effects of backscattered sound (which are negligible for most ocean-acoustic propagation problems), simplifying the computation of propagation loss.

permanent threshold shift (PTS)

An irreversible loss of hearing sensitivity caused by excessive noise exposure. Considered auditory injury. Compare with temporary threshold shift.

phocid

Member of the family Phocidae, one of the three groupings of pinnipeds (along with otariids and walrus). These true/earless seals are more adapted to in-water life than are otariids, which have more terrestrial adaptations. Phocids use their hind flippers to propel themselves underwater.

phocid pinnipeds underwater (PW), phocid carnivores in water (PCW)

See functional hearing group.

pinniped

Member of the superfamily Pinnipedia, which is composed of phocids (true seals or earless seals), otariids (eared seals or fur seals and sea lions), and walrus.

point source

A source that radiates sound as if from a single point.

propagation loss (PL)

Difference between a source level (SL) and the level at a specified location, $\mathrm{PL}(x) = \mathrm{SL} - L(x)$. Unit: decibel (dB). See also transmission loss.

radiated noise level (RNL)

A source level that has been calculated assuming sound pressure decays geometrically with distance from the source, with no influence of the sea-surface or seabed. Often used to quantify source levels of vessels or industrial operations from measurements. See also monopole source level.

received level

The level of a given field variable measured (or that would be measured) at a given location.

reference value

Standard value of a quantity used for calculating underwater sound level. The reference value depends on the quantity for which the level is being calculated:

Quantity	Reference value
Sound pressure	$p_0{}^2$ = 1 μPa^2 or p_0 = 1 μPa
Sound exposure	E_0 = 1 μPa^2 s
Sound particle displacement	$\delta_0{}^2$ = 1 pm^2
Sound particle velocity	$u_0{}^2$ = 1 nm^2/s^2
Sound particle acceleration	$a_0{}^2$ = 1 μm^2/s^4

shear wave

A mechanical vibration wave in which the direction of particle motion is perpendicular to the direction of propagation. Also called a secondary wave or S-wave. Shear waves propagate only in solid media, such as sediments or rock. Shear waves in the seabed can be converted to compressional waves in water at the water-seabed interface.

sirenians (SI)

Members of the order Sirenia, which includes several manatee species and the dugong. See also functional hearing group.

sound

A time-varying disturbance in the pressure, stress, or material displacement of a medium propagated by local compression and expansion of the medium. In common meaning, a form of energy that propagates through media (e.g., water, air, ground) as pressure waves.

sound exposure

Time integral of squared sound pressure over a stated time interval in a stated frequency band. The time interval can be a specified time duration (e.g., 24 h) or from start to end of a specified event (e.g., a pile strike, an airgun pulse, a construction operation). Unit: pascal squared second (Pa^2 s). Symbol: E.

sound exposure level (SEL)

The level (L_E) of the sound exposure (E) in a stated frequency band and time window: $L_E = 10\log_{10}(E/E_0)$ (ISO 18405:2017). Unit: decibel (dB). Reference value (E_0) for sound in water: 1 μPa^2 s.

sound exposure spectral density

Distribution as a function of frequency of the time-integrated squared sound pressure per unit bandwidth of a sound having a continuous spectrum (ISO 18405:2017). Unit: pascal squared second per hertz (Pa^2 s/Hz).

sound field

Region containing sound waves.

sound pressure

The contribution to total pressure caused by the action of sound (ISO 18405:2017). Unit: pascal (Pa). Symbol: p.

sound pressure level (SPL), rms sound pressure level

The level (L_p) of the time-mean-square sound pressure (p_{rms}^2) in a stated frequency band and time window: $L_p = 10\log_{10}(p_{\mathrm{rms}}^2/p_0^2) = 20\log_{10}(p_{rms}/p_0)$, where rms is the abbreviation for root-mean-square. Unit: decibel (dB). Reference value (p_0^2) for sound in water: 1 μPa^2. SPL can also be expressed in terms of the root-mean-square (rms) with a reference value of p_0 = 1 μPa. The two definitions are equivalent.

sound speed profile

The speed of sound in the water column as a function of depth below the water surface.

source level (SL)

A property of a sound source equal to the sound pressure level measured in the far field plus the propagation loss from the acoustic centre of the source to the receiver position. Unit: decibel (dB). Reference value: 1 μPa^2 m^2.

spectrum

Distribution of acoustic signal content over frequency, where the signal's content is represented by its power, energy, mean-square sound pressure, or sound exposure.

surface duct

The upper portion of a water column within which the gradient of the sound speed profile causes sound to refract upward and therefore reflect repeatedly off the surface resulting in relatively long-range sound propagation with little loss.

temporary threshold shift (TTS)

Reversible loss of hearing sensitivity caused by noise exposure. Compare with permanent threshold shift.

thermocline

A depth interval near the ocean surface that experiences larger temperature gradients than the layers above and below it due to warming or cooling by heat conduction from the atmosphere and by warming from the sun.

transmission loss (TL)

The difference between a specified level at one location and that at a different location: $\mathrm{TL}(x_1,x_2) = L(x_1) - L(x_2)$ (ISO 18405:2017). Unit: decibel (dB). See also propagation loss.

unweighted

Term indicating that no frequency-weighting function is applied.

very high-frequency (VHF) cetaceans

See functional hearing group.

wavelength

Distance over which a wave completes one cycle of oscillation. Unit: metre (m). Symbol: λ.

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Appendix A. Acoustic Metrics

A.1. Pressure Related Acoustic Metrics

Underwater sound pressure amplitude is measured in decibels (dB) relative to a fixed reference pressure of p_0 = 1 μPa. Because the perceived loudness of sound, especially impulsive noise such as from seismic airguns, pile driving, and sonar, is not generally proportional to the instantaneous acoustic pressure, several sound level metrics are commonly used to evaluate noise and its effects on marine life. We provide specific definitions of relevant metrics used in the accompanying report. Where possible we follow the ANSI and ISO standard definitions and symbols for sound metrics, but these standards are not always consistent.

The sound pressure level (SPL; L_p; dB re 1 μPa) is the rms pressure level in a stated frequency band over a specified time window (T, s) containing the acoustic event of interest. It is important to note that SPL always refers to a rms pressure level and therefore not instantaneous pressure:

$$L_p = 10\log_{10}\left(\frac{1}{T}\int_T p^2(t)dt \Big/ p_0^2\right) \tag{A-1}$$

The SPL represents a nominal effective continuous sound over the duration of an acoustic event, such as the emission of one acoustic pulse, a marine mammal vocalization, the passage of a vessel, or over a fixed duration. Because the window length, T, is the divisor, events with similar sound exposure level (SEL) but more spread out in time have a lower SPL.

The sound exposure level (SEL; L_E; $L_{E,p}$; dB re 1 μPa^2·s) is a measure related to the acoustic energy contained in one or more acoustic events (N). The SEL for a single event is computed from the time-integral of the squared pressure over the full event duration (T):

$$L_E = 10\log_{10}\left(\int_T p^2(t)dt \Big/ T_0 p_0^2\right) \tag{A-2}$$

where T_0 is a reference time interval of 1 s. The SEL continues to increase with time when non-zero pressure signals are present. It therefore can be construed as a dose-type measurement, so the integration time used must be carefully considered in terms of relevance for impact to the exposed recipients.

SEL can be calculated over periods with multiple acoustic events or over a fixed duration. For a fixed duration, the square pressure is integrated over the duration of interest. For multiple events, SEL can be computed by summing (in linear units) SEL of the N individual events:

$$L_{E,N} = 10\log_{10}\left(\sum_{i=1}^{N} 10^{\frac{L_{E,i}}{10}}\right). \tag{A-3}$$

Appendix B. Methods and Parameters

This section describes the specifications of the seismic source that was used at all sites and the environmental parameters used in the propagation models.

B.1. Estimating Range to Thresholds Levels

Sound level contours were calculated based on the underwater sound fields predicted by the propagation models, sampled by taking the maximum value over all modelled depths above the sea floor for each location in the modelled region. The predicted distances to specific levels were computed from these contours. Two distances relative to the source are reported for each sound level: 1) R_{max}, the maximum range to the given sound level over all azimuths, and 2) $R_{95\%}$, the range to the given sound level after the 5% farthest points were excluded (see examples in Figure B-1).

The $R_{95\%}$ is used because sound field footprints are often irregular in shape. In some cases, a sound level contour might have small protrusions or anomalous isolated fringes. This is demonstrated in the image in Figure B-1(a). In cases such as this, where relatively few points are excluded in any given direction, R_{max} can misrepresent the area of the region exposed to such effects, and $R_{95\%}$ is considered more representative. In strongly asymmetric cases such as shown in Figure B-1(b), on the other hand, $R_{95\%}$ neglects to account for significant protrusions in the footprint. In such cases R_{max} might better represent the region of effect in specific directions. Cases such as this are usually associated with bathymetric features affecting propagation. The difference between R_{max} and $R_{95\%}$ depends on the source directivity and the non-uniformity of the acoustic environment.

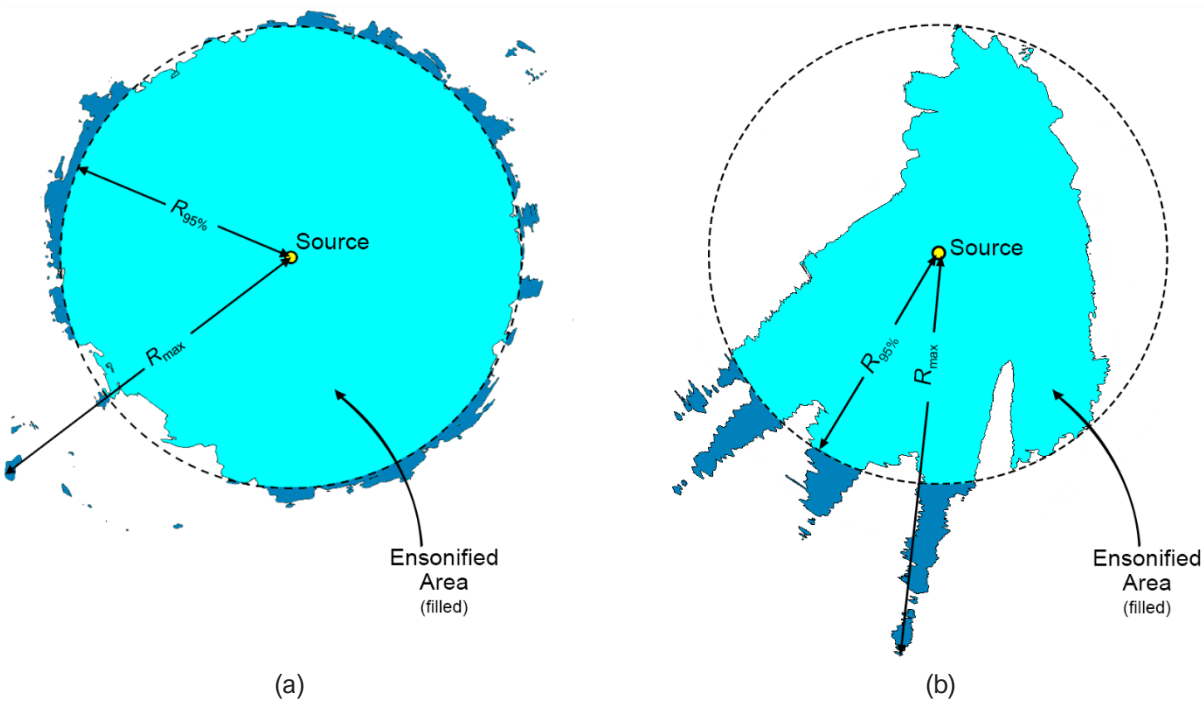

Figure B-1. Sample areas ensonified to an arbitrary sound level with R_{max} and $R_{95\%}$ ranges shown for two different scenarios. (a) Largely symmetric sound level contour with small protrusions. (b) Strongly asymmetric sound level contour with long protrusions. Light blue indicates the ensonified areas bounded by $R_{95\%}$; darker blue indicates the areas outside this boundary which determine R_{max}.

B.2. Environmental Parameters

B.2.1. Bathymetry

Water depths throughout the modelled areas were extracted from the Australian Bathymetry and Topography Grid, a 9 arc-second grid rendered for Australian waters (Whiteway 2009). Bathymetry data were re-gridded onto a Map Grid of Australia (MGA) coordinate projection (Zone 54) with a regular grid spacing of 250 × 250 m.

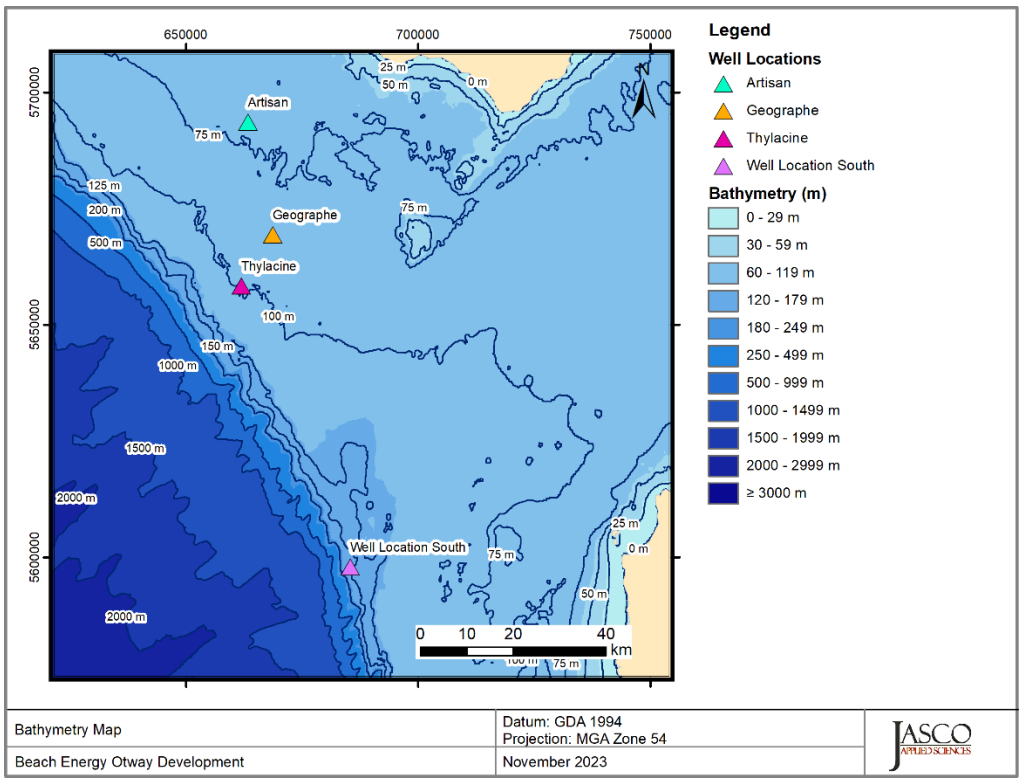

Figure B-2. Bathymetry map of the Beach Otway development area.

B.2.2. Sound speed profile

The sound speed profile in the area was derived from temperature and salinity profiles from the U.S. Naval Oceanographic Office's *Generalized Digital Environmental Model V 3.0* (GDEM; Teague et al. 1990, Carnes 2009). GDEM provides an ocean climatology of temperature and salinity for the world's oceans on a latitude-longitude grid with 0.25° resolution, with a temporal resolution of one month, based on global historical observations from the U.S. Navy's Master Oceanographic Observational Data Set (MOODS). The climatology profiles include 78 fixed depth points to a maximum depth of 6800 m (where the ocean is that deep). The GDEM temperature-salinity profiles were converted to sound speed profiles according to Coppens (1981).

Mean monthly sound speed profiles were derived from the GDEM profiles at distances less than 7 km around the modelled site. The June sound speed profile is expected to be most favourable to longer-range sound propagation across the entire year. As such, June was selected for sound propagation modelling to ensure precautionary estimates of distances to received sound level thresholds. For the pygmy blue whale period between November and January November is expected to be most favourable to longer-range propagation in that period. Figure B-3 shows the resulting profiles, which were used as input to the sound propagation modelling.

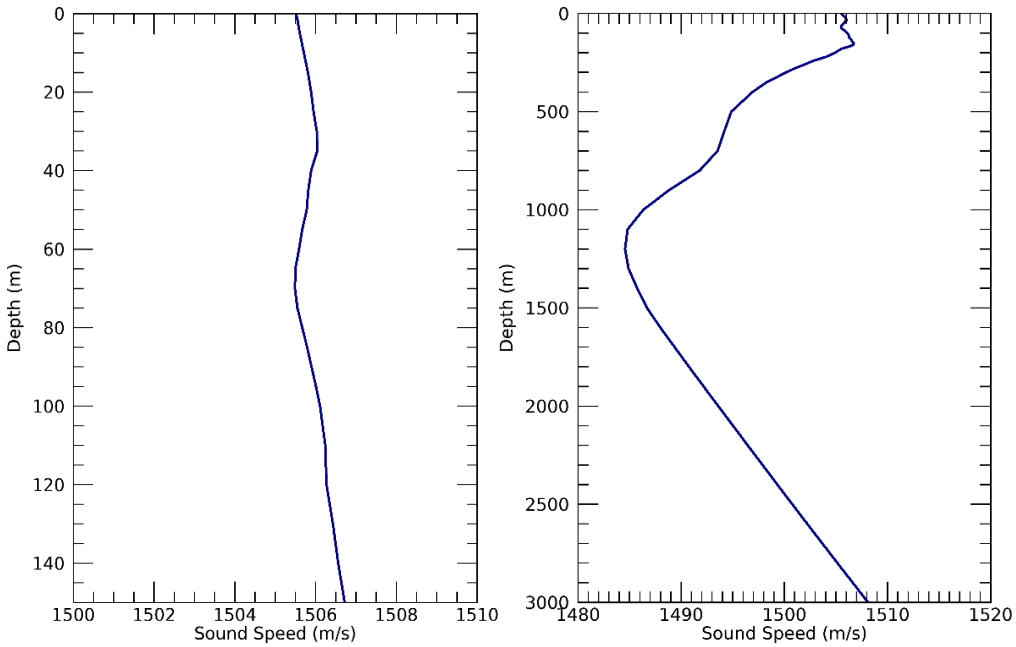

Figure B-3. The modelling sound speed profile corresponding to June for the top 150 m (left) and 3000 m (right) Profiles are calculated from temperature and salinity profiles from *Generalized Digital Environmental Model* V 3.0 (GDEM; Teague et al. 1990, Carnes 2009).

B.2.3. Geoacoustics

A single geoacoustic profile was used for modelling. Geoacoustic parameters used for all modelled sites were derived from sedimentary grain size measurements from the Australian Government's Marine Sediments (MARS) database (Heap 2009). On average, the surficial grain size indicates silty sand is present throughout the modelled area. Representative grain sizes were used in the grain-shearing model proposed by Buckingham (2005) to estimate the geoacoustic parameters required by the sound propagation models. Table B-1 lists the geoacoustic parameters used for modelling. This profile is expected to better represent the slope environment and may yield less accurate towards the continental shelf. On the shelf it is possible that a less reflective seabed type consisting of limestone may be present (Duncan et al. 2013). It is expected that towards the shelf the estimate to threshold ranges may be overestimated.

Table B-1. Geoacoustic profile for all modelled sites.

Depth below seafloor (m)	Predicted lithology	Density (g/cm³)	Compressional wave		Shear wave	
			Speed(m/s)	Attenuation(dB/λ)	Speed(m/s)	Attenuation(dB/λ)
0–10	Silty carbonate sand to semi-cemented limestone	1.88	1605–1700	0.35–0.70	255	3.65
10–20		1.88–1.89	1700–1755	0.70–0.85		
20–50		1.89–1.90	1755–1850	0.85–1.15		
50–100		1.90–1.92	1850–1950	1.15–1.35		
100–200		1.92–1.96	1950–2100	1.35–1.60		
200–500		1.96–2.05	2100–2355	1.60–1.95		
>500		2.05	2355	1.95		

G.4 Beach Otway Development Acoustic Monitoring: Characterisation, Validation, and Marine Mammals McPherson et al. 2021)

Beach Otway Development Acoustic Monitoring

Characterisation, Validation, and Marine Mammals

JASCO Applied Sciences (Australia) Pty Ltd

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The results presented herein are relevant within the specific context described in this report. They could be misinterpreted if not considered in the light of all the information contained in this report. Accordingly, if information from this report is used in documents released to the public or to regulatory bodies, such documents must clearly cite the original report, which shall be made readily available to the recipients in integral and unedited form.

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Executive Summary

Overview

JASCO Applied Sciences (Australia), JASCO, completed a monitoring study for Beach Energy (Operations) Ltd (Beach Energy) in relation to the exploration drilling activities at the Artisan-1 well with the aim of completing an acoustic characterisation of the drilling and associated vessel activity within the Otway Basin. Through this characterisation, validation of the modelling predictions used in Beach Energy Otway Environment Plans (EPs) for the development drilling activities was required.

The exploration well Artisan-1, drilled by the *Ocean Onyx*, was selected for the monitoring program because the predicted distances to thresholds for effects on marine mammals, including pygmy blue whales, were farthest at this location in the modelling study used for the EP (Koessler et al. 2020), as well as because it was the first well in the Otway drilling campaign.

Four JASCO Autonomous Multichannel Acoustic Recorders (AMARs) in C-lander moorings were deployed in February and retrieved in early April. Stations 1 through 4 were deployed at distances of 0.336, 1.13, 5.11, and 25 km from the *Ocean Onyx*. The AMARs recorded continuously at 24-bit resolution and 64 kHz sample rate for the entire deployment. The three stations closest to the *Ocean Onyx* were configured with a single hydrophone, whilst the station 25 km away was configured with three hydrophones to provide directional processing of received sounds.

To assist in the characterisation of *Ocean Onyx* and attendant support vessels, the vessels conducted specific activities under dynamic positioning and followed a nominated transit track between the *Ocean Onyx* and Geelong Supply Base. No specific operational requests were made of the *Ocean Onyx* and vessels during normal drilling activities due to the complexity of operationally meeting any requests. Over the course of the monitoring program, the MODU and support vessels engaged in different operational states with different uncontrollable contributors, such as variable drilling operations, resupply and support operations, weather conditions, and merchant shipping.

Data Analysis

The data was analysed to determine total ocean sound levels, which presented the expansive data in a manner that documented the underwater sound conditions near Artisan-1 and allowed a comparison over time, and with external factors that affect sound levels, such as weather and human activities. The data was presented using a range of graphical and statistical representations. JASCO's ShipSound software was used to determine the source levels for the Ocean Onyx during drilling activities and the support vessels whilst under dynamic positioning and transit.

ShipSound calculates two kinds of vessel source levels from the data window: Radiated Noise Level (RNL) and Monopole Source Level (MSL). RNL is equal to the measured sound pressure level, back-propagated according to the distance between a source and the hydrophone using an empirical propagation loss approach. MSL is equal to the measured sound pressure level scaled according to a numerical acoustic propagation loss (PL) model that accounts for the effect of the local environment on sound propagation (i.e., sea-surface reflection, water column refraction and absorption, and bottom loss).

The presence of sounds produced by marine mammals were searched for using a combination of automated detector-classifiers (referred to as automated detectors) and manual review by experienced analysts. The manual review was limited to only a subset (0.5%) of acoustic data, as this was not the primary aim of the project.

Results

The analysis of data at the two stations furthest from the Ocean Onyx, 3 and 4 (5 and 25 km), found a positive correlation between wind speeds and wave heights and sound levels for frequencies over 100 Hz, with the relationship with wind speed being stronger than that for wave height. For both of these stations shipping is a strong contributor. Most days recorded a significant number of vessel detections, with the contributions at Station 4 typically between 40 and approximately 100 Hz. The station most representative of a typical ambient soundscape within the region, Station 4, had a median broadband ambient noise of 104.5 dB re 1 μPa. Dolphins and pygmy blue whales were identified in the data. The data for pygmy blue whales indicates an apparent trend in the animals early in the recording being more to the east and later in the recording being more to the west, through the directional analysis of data from Station 4, but the data were too sparse (and the analysis too limited) to confirm anything about animal movements. Extended analysis may provide more details about their presence and movements during the drilling activities.

The provided drill logs for the Artisan-1 well were reviewed to identify periods of activity defined as drilling, as this was the activity considered in the modelling study Koessler et al. (2020). Seventy ten-minute time periods were deemed suitable for use, which resulted in the MSL being calculated over three different drilling depth ranges and presented as mean and maximum levels. MSL's were calculated for support vessels during dynamic positioning trials and transit, with results summarised in Table 1.

Table 1. Project drill rig and support vessel monopole source levels (MSLs).

Vessel	Measurement	Monopole source level (dB re 1 µPa m)	
		Mean	Maximum
Ocean Onyx	Drilling 26”x42” hole from 95-172 m	175.2	180.0
	Drilling 17.5” hole from 365-621 m	169.3	171.0
	Drilling 12.25” hole up to 1851 m	162.7	170.6
Siem *Sapphire*	Dynamic Positioning Trial	193.9	194.2
	Transit at 7 kn	171.6	173.6
	Transit at 9 kn	185.0	—*
Siem *Aquamarine*	Transit at 9 kn	182.8	—*
Siem *Topaz*	Transit at 9 kn	185.2	—*

* Not reported.

Validation

The Monopole Source Levels determined through the measurement study differed from those either estimated for use in the modelling study or those determined using proxy sources. The key differences are as follows:

- The support vessels are quieter than estimated when they are under slow transit speeds, such as 7 kn.
- The support vessels are louder than estimated when they are travelling at faster transit speeds, with 9 kn used to represent these speeds and the associated MSL.
- The support vessels are louder than estimated when holding station or moving under dynamic positioning.
- The drilling operations of the *Ocean Onyx* are both louder at some frequencies and quieter at others than those for the proxy rig the *Polar Pioneer* (Austin et al. 2018), although the results presented for the *Polar Pioneer* did not examine the changes in level with increased drilling depth (over time) as completed within this study.

The results from the measurement study could not be directly compared to the modelling presented in Koessler et al. (2020) due to the differences in actual events compared to the nominal representative scenarios developed and evaluated as part of the EP assessment process. Additionally, the measurements were obtained at a receiver located 1.2 m off the seafloor, which is not the maximum-over-depth results reported in the modelling study. The ranges obtained from the measurement study are reported in relation to the Artisan-1 well location, and thus the centre of the *Ocean Onyx*. The ranges in the modelling study are reported from a range of locations, including the centroids of multiple sources, thus it is not possible to report the measurement results in a similar fashion using the small number of recording locations used in this study.

The accuracy of the broadband calculated propagation loss for the Otway Basin continental shelf environment depends significantly upon the frequency content of the radiating sound source together with thickness of the sand layer on carbonate seabed (calcarenite) likely to occur within the region. In general, the thinner the sand layer, the greater the overall propagation loss.

When comparing SPL data fits for Stations 1–3, the loss rate is higher than what would have been expected in this environment, considering the higher monopole source levels for the support vessel on DP derived from trial measurements. The differences are likely attributable to the potential absence of a sand veneer.

Comparisons were conducted using JASCO's Marine Operations Noise Model (MONM), a wide-angle parabolic equation model which applies the BELLHOP Gaussian beam acoustic ray-trace model at higher frequencies, and JASCO's wavenumber integration model (VSTACK) which can fully account for the elasto-acoustic properties of the sub-bottom. The agreement between the models was excellent when only a comparatively thin (1 m thick) layer of sand overlies the carbonate seabed structure. In an environment such as this, MONM could have been used without correction. However, the comparisons indicate a much higher rates of loss, as would be expected if no (or only a very thin) sand layer were present.

A better understanding of the propagation loss environment, and the revision of the representation and treatment of it through the measurement study, enabled the modelling scenarios for the activities at Artisan-1 presented in Koessler et al. (2020) to be recalculated. The revised results for distances to maximum-over-depth SPL isopleths are presented in Table 2, and the revised results for distances to maximum-over-depth SEL thresholds presented in Table 3.

The understanding of the environment gained through the measurement study allowed for both the geological environment to be represented in a site-specific fashion and the use of a more appropriate configuration of numerical models to represent the propagation loss. The application of the revised modelling approach to represent other Beach Energy activities on the continental shelf of the Otway Basin would be appropriate.

Table 2. Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) to the marine mammal behavioural response threshold of 120 dB re 1 µPa sound pressure level (SPL) from the most appropriate location for considered sources per scenario (see table footnotes).

SPL (L_p; dB re 1 µPa)	MODU (Scenario 5)		OSV standby (Scenario 6)		MODU and OSV resupply (Scenario 7)[A]		MODU and OSV standby (Scenario 8)[B]	
	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)
120[C]	1.17	1.09	0.37	0.35	7.02	6.41	2.09	1.9

[A] Radial distance reported from the mid-point between the Mobile Offshore Drilling Unit (MODU) and the Offshore Support Vessel (OSV) on dynamic positioning (DP) in resupply operations

[B] Radial distances for isopleths/thresholds that envelope the MODU and OSV were reported from the mid-point between the MODU and the centre of the OSV standby area. Otherwise radial distances reported from the OSV in the standby area.

[C] Threshold for marine mammal behavioural response to continuous noise (NOAA 2019).

A dash indicates the level was not reached within the limits of the modelling resolution (25 m).

Table 3. Maximum (R_{max}) horizontal distances (in km) to frequency-weighted 24 hour sound exposure level (SEL_{24h}) thresholds for permanent threshold shift (PTS) and temporary threshold shift (TTS) thresholds based on NMFS (2018) and Finneran et al. (2017) from the most appropriate location for considered sources per scenario, and ensonified area (km²).

Hearing group	SEL_{24h} threshold ($L_{E,24h}$; dB re 1 µPa² s)[B]	MODU (Scenario 5)		OSV standby (Scenario 6)		MODU and OSV resupply (Scenario 7)[A]		MODU and OSV standby (Scenario 8)[A]	
		R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)
PTS									
LF cetaceans	199	–	–	–	–	–	–	–	–
MF cetaceans	198	–	–	–	–	–	–	–	–
HF cetaceans	173	0.19	0.11	–	–	0.2	0.12	0.19	0.11
Phocid seals	201	–	–	–	–	–	–	–	–
Otariid seals	219	–	–	–	–	–	–	–	–
Turtles	220	–	–	–	–	–	–	–	–
TTS									
LF cetaceans	179	0.31	0.31	1.01	0.35	0.95	2.78	0.31	0.66
MF cetaceans	178	0.13	0.05	–	–	0.16	0.06	0.13	0.05
HF cetaceans	153	1.07	3.44	1.01	0.18	1.09	3.86	1.06	3.64
Phocid seals	181	0.12	0.05			0.35	0.28	0.12	0.05
Otariid seals	199	–	–	–	–	–	–	–	–
Turtles	200	–	–	–	–	–	–	–	–

[A] Radial distance reported from the centre of the MODU, unless indicated otherwise.
[B] Frequency weighted.
A dash indicates the level was not reached within the limits of the modelling resolution (25 m).

1. Introduction

JASCO Applied Sciences (Australia), JASCO, completed a monitoring study for Beach Energy (Operations) Ltd (Beach Energy) in relation to the exploration drilling activities at the Artisan-1 well with the aim of completing an acoustic characterisation of the drilling and associated vessel activity within the Otway Basin. Through this characterisation, it was then required to validate the modelling predictions used in Beach Energy Otway Environment Plans (EPs) for the development drilling activities. These validation results are applicable for drilling, construction, and operational activities within the Otway Basin.

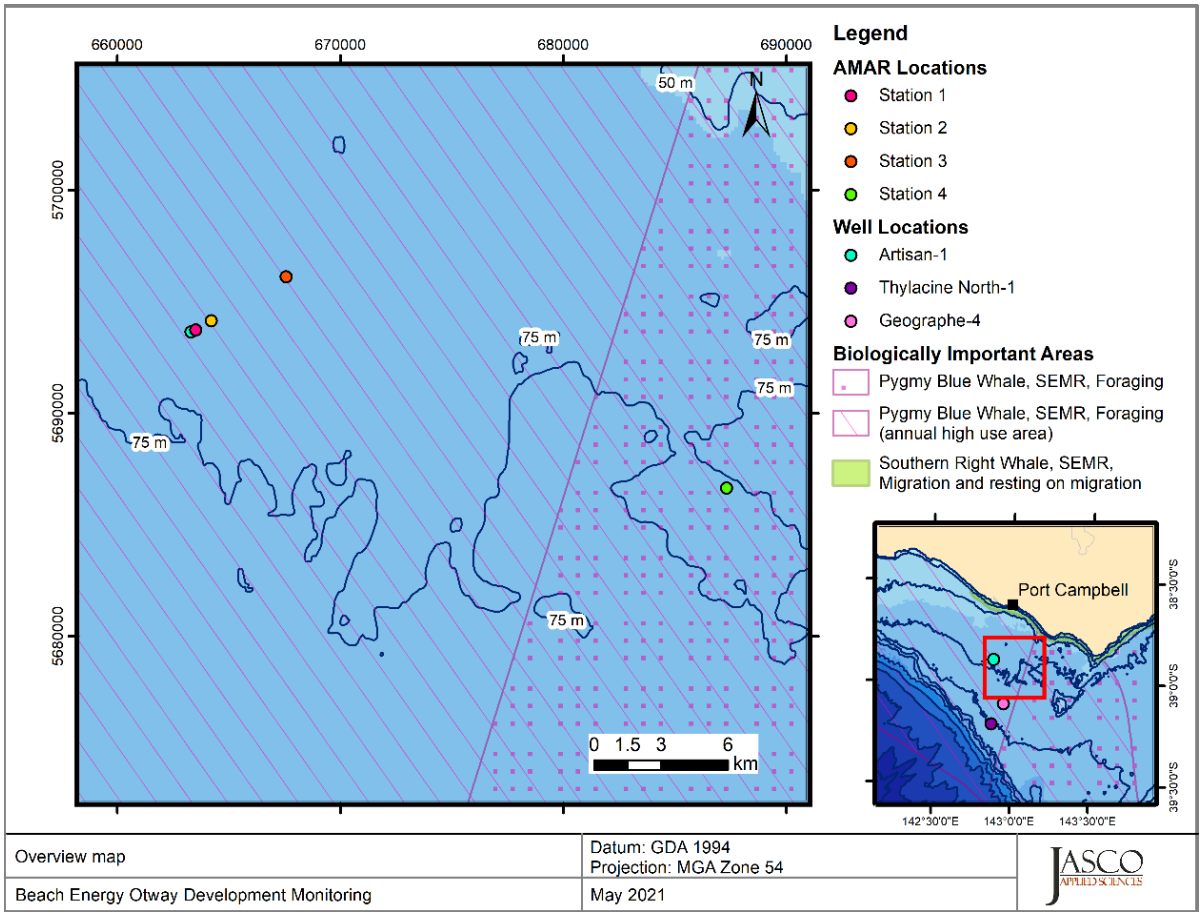
The exploration well Artisan-1 was selected for the monitoring program, because the predicted distances to thresholds for effects on marine mammals, including pygmy blue whales, were farthest at this location in the modelling study used for the EP (Koessler et al. 2020), as well as because it was the first well in the Otway drilling campaign.

This report presents an overview of the operations, environment, and measurement approaches (Section 2); general information about the marine acoustic environment (Section 3); the methods used for the data analysis, presentation, and modelling validation (Section 4); results of the monitoring program (Section 5); the validation analysis (Section 6); and a discussion of the program results and findings (Section 7).

The location of the four acoustic recording stations and the Artisan-1 well are provided in Table 4 and shown in Figure 1. One JASCO Autonomous Multichannel Acoustic Recorders (AMAR) was deployed at each recording station.

Table 4. Artisan-1 well and acoustic recording stations, including distance to Artisan-1.

Item	Latitude (S)	Longitude (E)	MGA Zone 54 (GDA94)		Water depth (m)	Distance to Artisan-1 (km)
			X (m)	*Y* (m)		
Artisan-1 (well)	38° 53.49077'	142° 52.94869'	663262.0	5693578.0	71.6	–
Station 1	38° 53.39316'	142° 53.14475'	663549.2	5693753.0	71.7	0.336
Station 2	38° 53.16585'	142° 53.61184'	664233.1	5694159.0	70.5	1.13
Station 3	38° 52.04100'	142° 55.95360'	667662.6	5696169.0	68.9	5.11
Station 4	38° 56.93456'	143° 9.71333'	687345.7	5686671.0	73.6	25.05



Overview map	Datum: GDA 1994 Projection: MGA Zone 54	JASCO APPLIED SCIENCES
Beach Energy Otway Development Monitoring	May 2021	

Figure 1. Otway Development Area showing location of the JASCO recorder stations.

2. Background Information

2.1. Operational Overview and Logs

The Otway Development Drilling Campaign being undertaken by Beach Energy utilises the *Ocean Onyx* Mobile Offshore Drilling Unit (MODU) (Figure 2). It is held in position via anchors and chains, as opposed to using thrusters, and has dimensions of approximately 100 m in length and width, and a draft of 22.7 m.

Figure 2. *Ocean Onyx* semi-submersible platform.

The following information was provided by Beach Energy:

- Drilling activity logs for the *Ocean Onyx,*
- Daily operational logs for the Development Drilling program,
- Daily vessel activity logs, and
- Vessel locations in ~15-minute increments from the Siem navigation systems.

The operational and activity logs used local time, which was Australian Eastern Daylight Time (AEDT), UTC+11 until 4 Apr 2021 at 3:00 am, when they changed over to Australian Eastern Standard Time (AEST), UTC+10. Therefore, AEDT is considered local time for the monitoring program. Vessel location data, including and Automated Identification System (AIS) data, as well as other ancillary environmental data and JASCO's recorders use UTC as the time zone. Thus, to avoid potential confusion, all timestamps were converted to UTC.

The *Ocean Onyx* anchoring operation commenced on 11 Feb 2021 and completed on 12 Feb 2021 local time; therefore, 01:00 12 Feb 2021 UTC was considered the start of data with the *Ocean Onyx* moored and in location after all anchor handling was complete. The *Ocean Onyx* departed Artisan-1 on 28 Mar 2021, after commencing disconnect operations on 26 Mar 2021 local time; therefore, 00:00 25 Mar 2021 UTC was considered the end of drilling or rig operations for analysis purposes.

2.2. Vessel Traffic

Regional vessel movement information, including for the project vessels, was obtained from MarineTraffic (www.marinetraffic.com), with data supplied for the time range between 1 Feb 2021 and 5 Apr 2021 in the region. The requested area was 11,003 km^2, with the vertices shown in Table 5.

The supplied data used a one-hour timestamp for vessel locations and all data were derived from satellites, with no terrestrial reporting stations in the vicinity. Figure 3 shows the marine traffic in the project area, derived from vessels broadcasting on the Automated Identification System (AIS), with a map focused on Artisan-1 shown in Figure 4.

Table 5. MarineTraffic data request bounds.

Vertex	Latitude (S)	Longitude (E)	MGA Zone 54 (GDA94)	
			X (m)	*Y* (m)
1	38° 38.71418'	142° 15.17165'	609029.0	5721846.24
2	38° 36.92154'	143° 55.51902'	754698.76	5721846.24
3	39° 17.70699'	143° 57.20532'	754698.76	5646313.77
4	39° 19.54340'	142° 15.89490'	609029.0	5646313.77

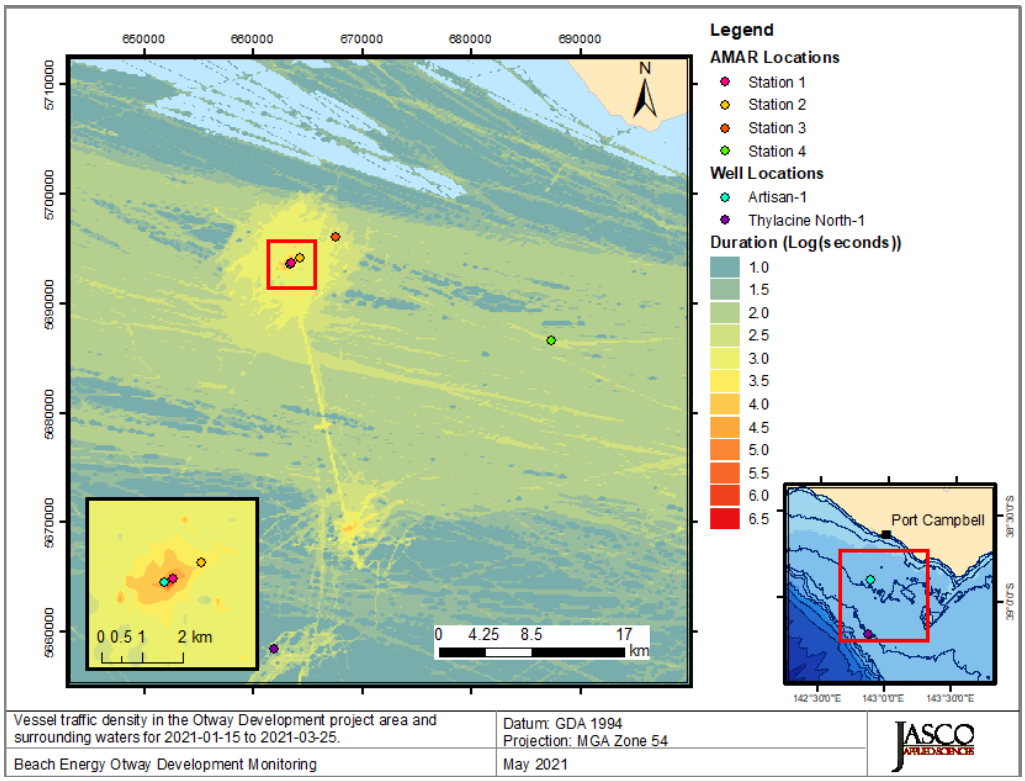


Figure 3. Vessel traffic density within the Development Drilling project area and surrounding waters for 15 Jan to 25 Mar 2021.

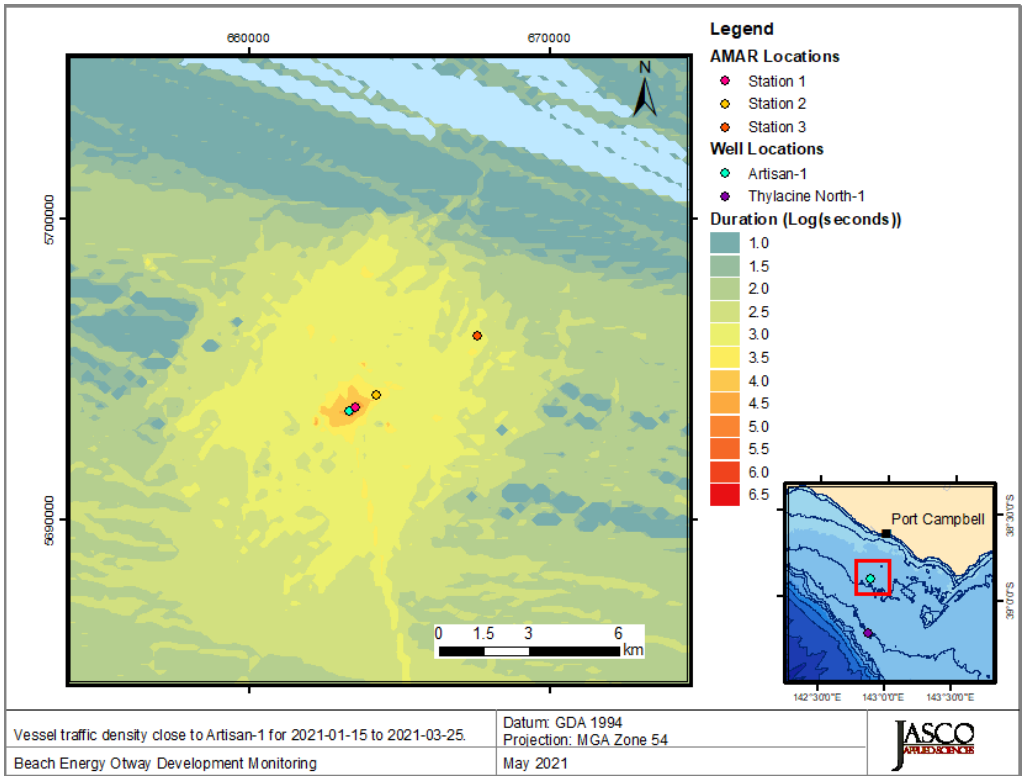


Figure 4. Vessel traffic density near Artisan-1 for 15 Jan to 25 Mar 2021.

2.3. Weather Conditions

Weather conditions at Artisan-1 were quantified through nowcast data provided by MetraWeather (Australia) for the period 00:00 on 1 Feb through until 24:00 6 Apr 2021 (UTC). The data included the following parameters:

- Significant wave height,
- Peak wave period,
- Peak wave direction,
- Significant wave height of swell >8 second period,
- Average wind speed,
- Wind direction, and
- Maximum wind gust speed.

Figure 5 shows the wave and swell weight, and Figure 6 shows the wind and gust speeds.

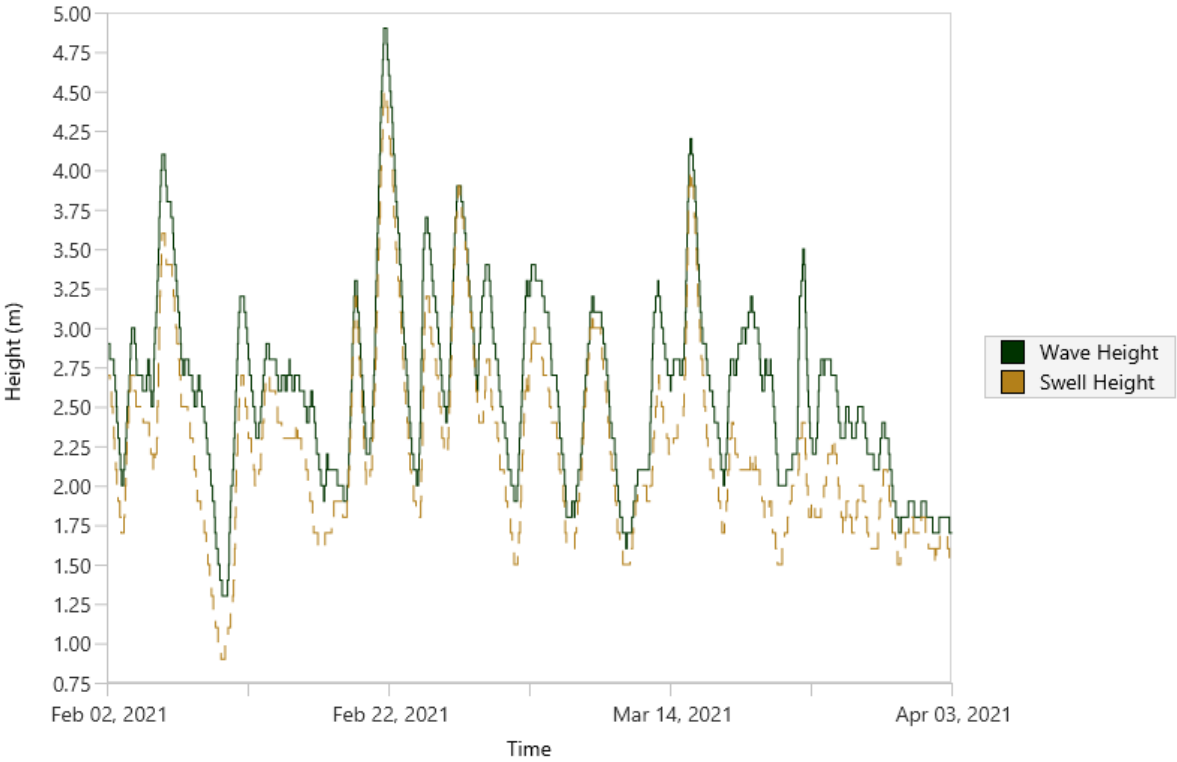


Figure 5. Hourly significant wave height (m) and significant swell height (m), with a period of greater than 8 seconds.

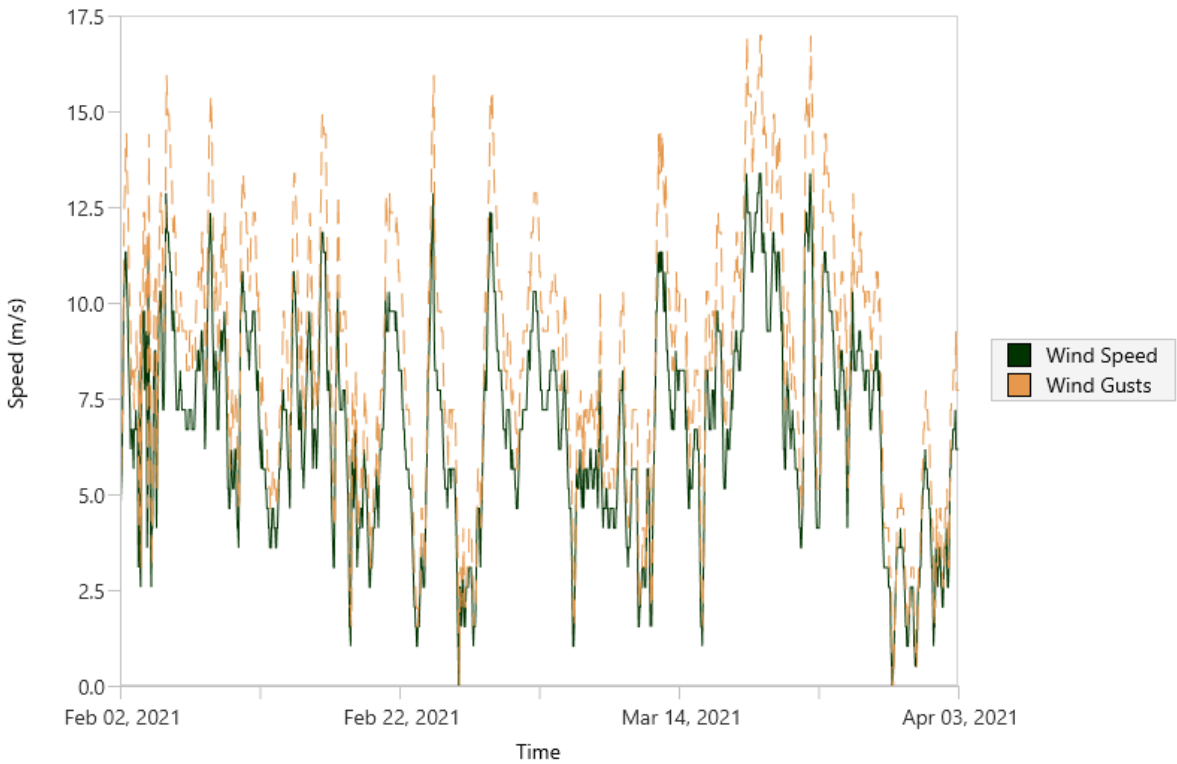


Figure 6. Hourly average wind speed (m/s) and maximum gust speed (m/s).

2.4. Geology

The propagation model used in this study considers a single geologic seabed profile for the Artisan area. The previous work by Koessler et al. (2020) considered two geologic and associated geoacoustic profiles. For deeper areas closer to the continental shelf edge, a profile characterised by well-cemented carbonate caprock (calcarenite) overlying semi-cemented calcarenite was used. Closer to the Artisan area the seabed, located in shallower waters, was characterised by a thin veneer of coarse sand/gravel overlying cemented and semi-cemented carbonate rock. This profile was selected based on a mixture of previous modelling studies (Wood and McPherson 2018) and client supplied geologic reports.

All these sources support a generalised geologic structure within the first 100 m seabed consisting of cemented or semi-cemented calcareous rock ('calcarenite') on the continental shelf within Artisan area. Collated information also indicated that there was the potential for a thin layer of coarse sand that could overlay the more cemented calcarenite. This was also indicated by seafloor sediment grab samples from the MARS sediment database (Heap 2009). The seabed environment was considered to be consistent with larger scale geological data and interpretations of the Australian continental shelf environment as summarised by James and Bone (2010), who indicated that the sediments along the continental shelf may be subject to transport and erosion yielding non-uniform distributions of seafloor sediment thickness.

2.5. Specific Source Measurement Operations

2.5.1. MODU Measurements

No operational requirements were requested of the *Ocean Onyx* or attendant support vessels while conducting resupply or standby operations during the drilling program due to the complexity of operationally meeting any requests. Over the course of the monitoring program, the MODU and support vessels engaged in different operational states, with different uncontrollable contributors, such as variable drilling operations, resupply and support operations, weather conditions, and merchant shipping. Operational details were obtained from the provided logs (Section 2.1).

2.5.2. Support Vessel Measurements

Specific operations were defined for the characterisation of the support vessels prior to the *Ocean Onyx* being moored, and while in transit to and from Geelong. For transit measurements, vessels were requested to pass along a defined track line according to ANSI S12.64 (R2014), with the vessel maintaining the straightest track possible and a requested separation from the AMAR of 150 m at the closest point of approach (CPA), with a water depth of 70 m. In deep water vessel noise measurements, it is a requirement for the vessels to be a minimum of either 100 m or one vessel length away from the recorder; in this case the typical vessel length is 91 m. Whilst there are standards for deep water source level measurements, there are none for shallow water environments. Methods to make accurate shallow water measurements of vessel source levels are currently being investigated by JASCO and DW Ship Consult for Transport Canada, with the findings to contribute to standard development (Ainslie et al. 2020); these methods were considered during the design of this study where possible.

The transit measurement track defined at Station 4 is shown in Figure 7, and in increased detail in Figure 8.

For measurements of dynamic positioning (DP), three exercises were defined, with *Exercise Two* completed twice. The three exercises all commenced at a horizontal separation of 150 m from the AMAR:

- *Exercise One*: Vessel to hold station, broadside to AMAR and operate at weather determined power levels for a minimum of 5 minutes.
- *Exercise Two*: Vessel to hold station, broadside to AMAR, then induce maximum reasonable thrust level and move in a perpendicular direction away from the AMAR in the up current direction for two minutes, reset and repeat exercise.
- *Exercise Three*: Vessel to hold station, broadside to AMAR, then using DP, step the vessel to the corners of a 10 × 10 m box using weather determined thruster levels.

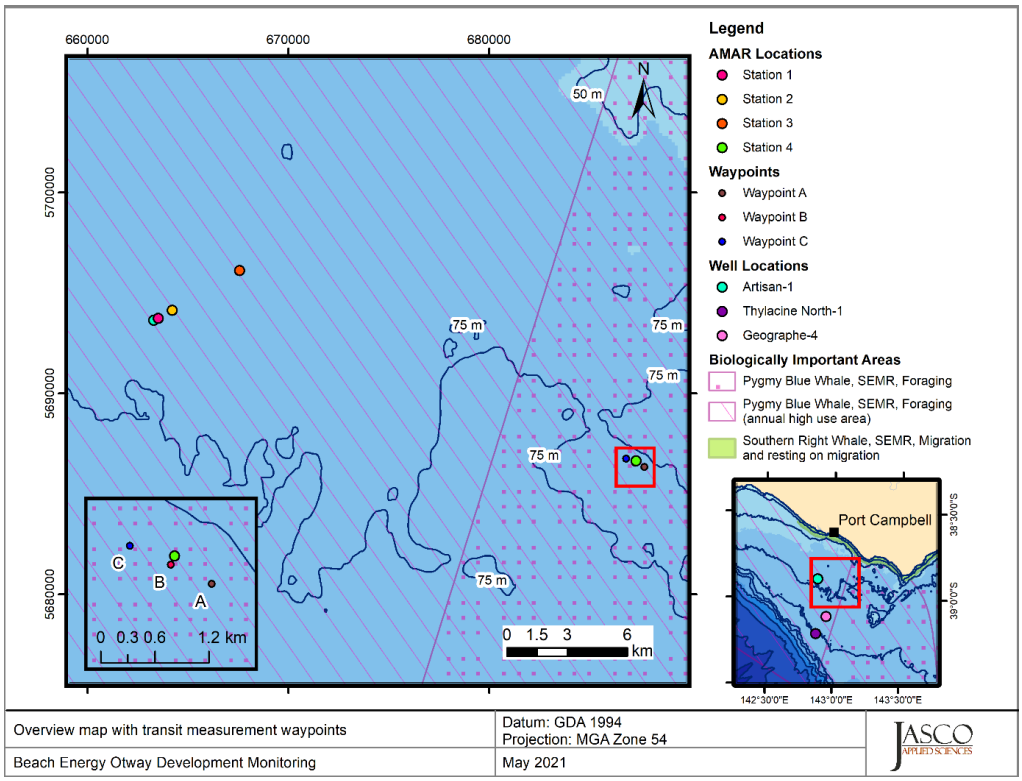


Figure 7. Map showing AMAR locations along with the three waypoints for the measurement track at Station 4 for transit vessels, Waypoints A, B, and C.

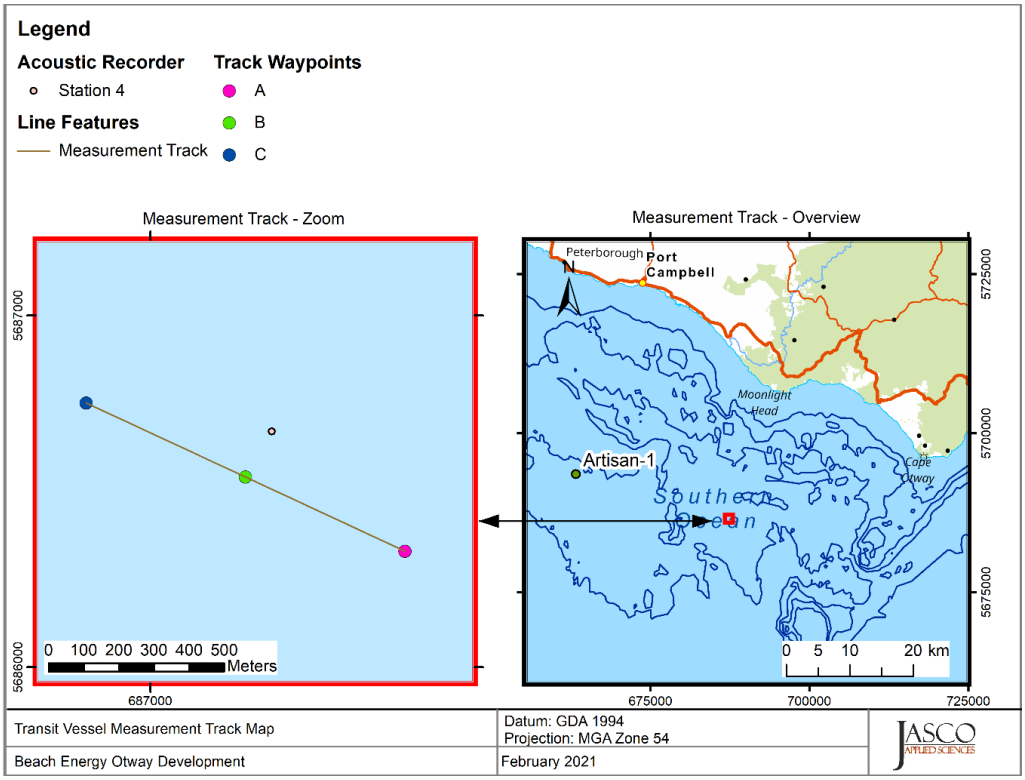


Figure 8. Zoom in of measurement track at Station 4 for transit vessels, as shown in Figure 7.

2.6. Noise Effect Criteria

To assess the potential effects of a sound-producing activity, it is first necessary to establish exposure criteria (thresholds) for which sound levels may be expected to have a negative effect on animals. Whether acoustic exposure levels might injure or disturb marine fauna is an active research topic. Since 2007, several expert groups have developed sound exposure level (SEL) based assessment approaches for evaluating auditory injury, with key works including Southall et al. (2007), Finneran and Jenkins (2012), Popper et al. (2014), United States National Marine Fisheries Service (NMFS 2018) and Southall et al. (2019). The number of studies that investigate the level of behavioural disturbance to marine fauna by anthropogenic sound has also increased substantially.

Two sound level metrics, sound pressure level (SPL), and SEL (Appendix A), are commonly used to evaluate non-impulsive noise and its effects on marine life. In this report, the duration of the SEL accumulation is defined as integrated over a 24 h time period. Appropriate subscripts indicate any applied frequency weighting applied. The acoustic metrics in this report reflect the amended ANSI and ISO standards for acoustic terminology, ANSI S1.1 (S1.1-2013), and ISO 18405:2017 (2017a).

The following thresholds and guidelines for this study were chosen because they represent the best available science, and sound levels presented in literature for fauna with no defined thresholds:

1. Frequency-weighted accumulated sound exposure levels (SEL; $L_{E,24h}$) from the US National Oceanic and Atmospheric Administration (NOAA) Technical Guidance (NMFS 2018) for the onset of permanent threshold shift (PTS) and temporary threshold shift (TTS) in marine mammals for non-impulsive sources.
2. Marine mammal behavioural threshold based on the current interim U.S. National Oceanic and Atmospheric Administration (NOAA) (2019) criterion for marine mammals of 120 dB re 1 µPa (SPL; L_p) for non-impulsive sound sources.

The criteria applied in this study to assess possible effects of vessel noise on marine mammals are summarised in Table 6, with frequency weighting explained in Appendix E.

Table 6. Criteria for effects of continuous noise exposure, including vessel noise, for marine mammals: Unweighted sound pressure level (SPL) and 24 h sound exposure level (SEL_{24h}) thresholds.

Hearing group	NOAA (2019)	NMFS (2018)	
	Behaviour	PTS onset thresholds (received level)	TTS onset thresholds (received level)
	SPL (L_p; dB re 1 µPa)	Weighted SEL_{24h} ($L_{E,24h}$; dB re 1 µPa^2 s)	Weighted SEL_{24h} ($L_{E,24h}$; dB re 1 µPa^2 s)
Low-frequency (LF) cetaceans	120	199	179
High-frequency (HF) cetaceans		198	178
Very high-frequency (VHF) cetaceans		173	153
Phocid seals		201	181
Otariid seals		219	199

L_p denotes sound pressure level period and has a reference value of 1 µPa.
L_E denotes cumulative sound exposure over a 24 h period and has a reference value of 1 µPa^{2}s.

3. Marine Acoustic Environment

3.1. Ambient Ocean Soundscape

The ambient acoustic environment, or soundscape, consists of cumulative contributions from abiotic (geophonic), biotic (biophonic), and man-made (anthrophonic) sound sources (Krause 2008). Variation in soundscape characteristics over time and space can act as proxies for geographical, biological, and anthropogenic events occurring within an environment.

In the marine environment, geophonic elements of the soundscape commonly correlate with oceanographic conditions. Increased sea state and wind speed lead to higher sound intensities across frequencies ranging from 500 Hz to 30 kHz, via sound produced by breaking waves, cavitation, surface flow noise, and pressure changes (Knudsen et al. 1948, Wenz 1962) (Figure 9). Rainfall elevates sound levels in the 1–15 kHz frequency range, via surface impacts and bubble entrainment (Heindsmann et al. 1955, Bom 1969, Scrimger et al. 1987). The specific frequency band affected by rainfall depends on rain strength and droplet size. Abiotic acoustic contributions are often unpredictable or irregular (Urick 1983). For example, significant low frequency acoustic energy can be contributed to marine soundscapes by earthquakes and sea ice movement (Urick 1974, Matsumoto et al. 2014). On the other hand, biophonic contributions often feature seasonal and diel activity patterns (Hannay et al. 2013, Erbe et al. 2017). Water movement, or flow noise, is considered to be a pseudo-noise that results from eddies and vortices forming as water flows past an acoustic receiver, and is not considered to be part of a marine soundscape (Strasberg 1979).

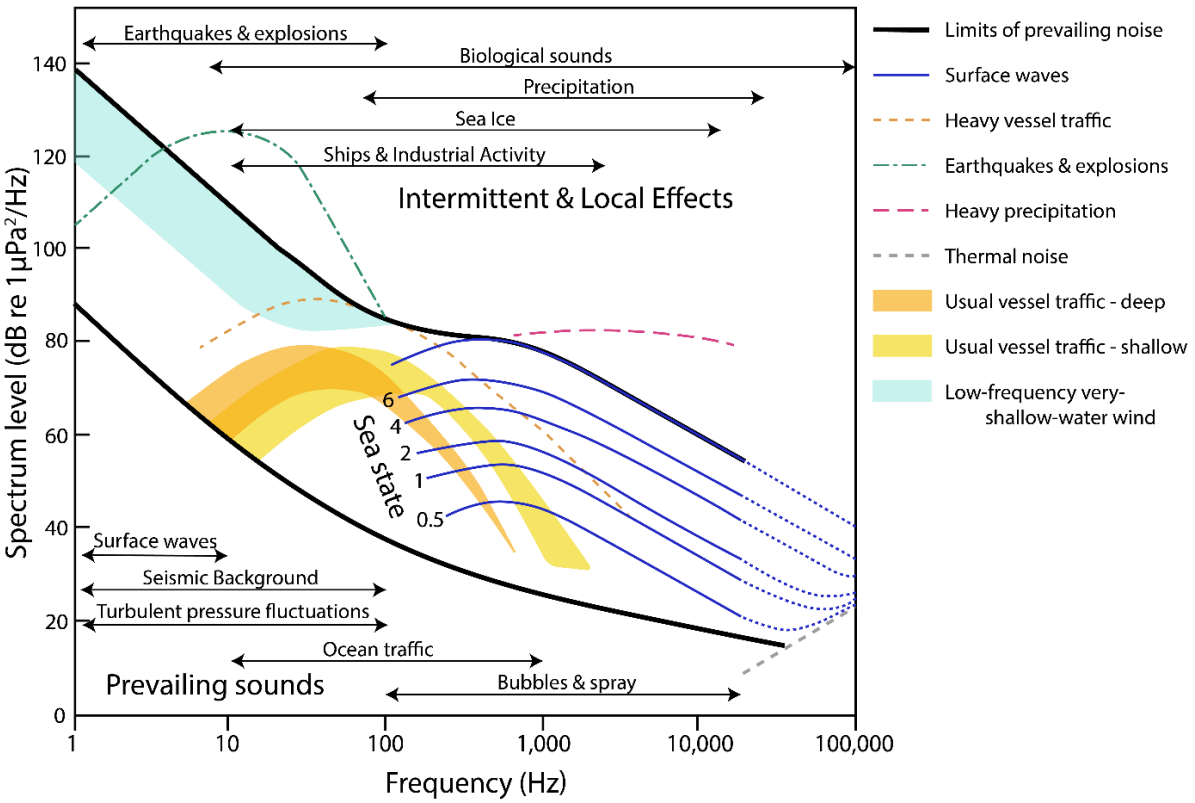


Figure 9. Wenz curves describing pressure spectral density levels of marine ambient sound from weather, wind, geologic activity, and commercial shipping (adapted from NRC 2003, based on Wenz 1962). Thick lines indicate limits of prevailing ambient sound.

3.2. Anthropogenic Contributors to the Soundscape

Anthropogenic (human-generated) sounds are relatively recent additions to soundscapes and, unlike biophonic contributors, often overlap in frequency, space, or time (Cato 1997, van Opzeeland and Boebel 2018). Anthrophonic contributors to global ocean noise include vessel traffic (commercial and recreational) at frequencies mainly in the frequency band 50–500 Hz. This sound can be a by-product of vessel operations, such as engine sound radiating through vessel hulls and cavitating propulsion systems, or it can be a product of active acoustic data collection with seismic surveys, military sonar, and depth sounding as the main contributors.

Marine construction projects involve vessel operations and project specific noise sources that can produce a range of both impulsive and non-impulsive noise. The contribution of anthropogenic sources to the ocean soundscape has increased from the 1950s to 2010, largely due to greater maritime shipping traffic (Ross 1976, Andrew et al. 2011). Oil and gas exploration with seismic airguns, marine pile driving, and oil and gas production platforms elevate sound levels over significant ranges when present (Bailey et al. 2010, Miksis-Olds and Nichols 2016, Delarue et al. 2018).The extent of seismic survey sounds has increased substantially following the expansion of oil and gas exploration into deep water, and seismic sounds have been detected across ocean basins (Nieukirk et al. 2004). Recent trends suggest that global sound levels are leveling off or potentially decreasing in some areas (Andrew et al. 2011, Miksis-Olds and Nichols 2016).

A recent paper examining seasonal fluctuations of ambient sound level in the Pacific Ocean (Ainslie et al. 2021) determined that a 5 dB increase in ambient sound level in the frequency range 63–125 Hz was caused by increases in vessel traffic and vessel size in the second half of the 20th century. A larger (approximate 10 dB) increase at lower frequencies (~16–32 Hz), often attributed incorrectly to shipping, occurs in bands dominated by baleen whale vocalisations. This paper also found that the seasonal dependence in ambient sound level is explained by seasonal changes in average sea surface temperature. This work provides a holistic and valuable examination of long-term trends.

3.3. Soniferous Marine Life

Biophonic contributors to marine soundscapes include tonal and pulsive vocalisations produced by marine mammals, fish, and invertebrates to communicate, orientate, and feed. Seasonal trends in biophonic sounds can act as proxies for behaviours, such as the migration of whales (e.g., Leroy et al. 2016, Gavrilov et al. 2018, Jolliffe et al. 2019). Other sounds of animal origin that contribute to marine soundscapes include by-products of behaviour, such as the snaps produced by snapping shrimp (*Alpheus heterochaelis*) during agonistic or foraging behaviours (Versluis et al. 2000). Snapping shrimp can increase background sound levels by a factor of 10 (20 dB) in the 500 Hz to 20 kHz frequency band (Hildebrand 2009). When a large number of sound-producing animals are present, both voluntary and involuntary sounds can combine to generate choruses where individual sounds cannot be distinguished. Chorusing fish can temporarily elevate the background sound levels by greater than tenfold in the 100 and 2000 Hz frequency band (Cato 1992, Zelick et al. 1999).

Diel trends in choruses can be indicative of time-specific behaviours, such as crepuscular or nocturnal fish activity (McCauley and Cato 2000, D'Spain and Batchelor 2006, McCauley and Cato 2016), with a variety of different species contributing the to the soundscape (Parsons et al. 2016, Parsons et al. 2017).

Many fish species produce sound during the breeding season or when engaged in agonistic behaviours (Amorim 2006). Several species of gadids (cod family), such as Northern cod (*Gadus morhua*) and haddock (*Melanogrammus aeglefinus*), form spawning aggregations that have been detected acoustically (Nordeide and Kjellsby 1999, Hawkins et al. 2002). The acoustic monitoring of fish is hindered by a limited understanding of their acoustic repertoire and behaviour. Nevertheless,

the stereotypical nature of acoustic signals produced by some species have led to the development of dedicated acoustic detectors (e.g., cod; see Urazghildiiev and Van Parijs 2016). These detectors allow for a more systematic analysis of acoustic data for fish occurrence. Irrespective of species identity, fish choruses can raise ambient noise levels and therefore influence local soundscapes (Erbe et al. 2015).

The main, best documented, biological contributors to the ocean soundscape are marine mammals. All studied cetacean and pinniped species produce sounds ranging in frequency from ~8 Hz for blue whale (*Balaenoptera musculus*) and fin whale (*B. physalus*) vocalisations to 150 kHz for some porpoise and dolphin vocalisations (Richardson et al. 1995).

Baleen whale sounds can double background sound levels within their frequency bands and persist for extended periods of time (McDonald et al. 2008), such as species off southern Australia, including pygmy blue and southern right whales, that are all notable contributors when present (Cato 1991, McCauley et al. 2001, Gavrilov and McCauley 2013, Erbe et al. 2016, McPherson et al. 2017). For instance, fin whale songs can raise noise levels in the 18–25 Hz band by 15 dB for extended durations (Simon et al. 2010).

Marine mammals, cetaceans in particular, rely almost exclusively on sound for navigating, foraging, breeding, and communicating (Clark 1990, Edds-Walton 1997, Tyack and Clark 2000). Although species differ widely in their vocal behaviour, most can be reasonably expected to produce sounds on a regular basis. Passive acoustic monitoring is therefore increasingly preferred as a cost-effective and efficient survey method. Seasonal and sex- or age-biased differences in sound production, as well as signal frequency, source level, and directionality, all influence the applicability and success rate of acoustic monitoring, thus its effectiveness must be considered separately for each species.

In most cases, baleen whale signals can be reliably identified to the species level, although, seasonal variation in the types of vocalisations produces results in seasonal differences in our ability to detect these species acoustically. For example, the tonal signals produced by blue, fin, and sei (*B. borealis*) whales tend to show lots of similarities in late spring and summer, but they are markedly different from September to April. These issues are considered and discussed on a case-by-case basis.

Knowledge of the acoustic signals of the marine mammals expected in the study area varies across species. These sounds can be split into two broad categories: Tonal signals, including baleen whale moans and delphinid whistles, and echolocation clicks produced by all odontocetes mainly for foraging and navigating. Although the signals of most species have been described to some extent, these descriptions are not always sufficient for reliable, systematic identification, let alone to design automated detectors to process large data sets.

3.4. Changes to Sound as it Travels in the Ocean

A key question in the study of underwater sound is how a sound changes in nature as it propagates from its source to a receiver some distance away. Understanding and modelling sound propagation in the ocean is a complex topic that is the subject of numerous studies. This section provides a descriptive overview of key sound propagation concepts to assist with the results presented in this report. These concepts are integral to interpreting how sounds emitted by a source are transformed into those received some distance away. The sounds are transformed by 1) geometric spreading losses; 2) reflection, scattering, and absorption at the seabed and sea surface; 3) refraction due to changes in sound speed with depth; and 4) absorption by sea water. This section does not address point 3), as sound refraction plays only a minor role in shallow water, such as the Otway Development area.

At one extreme, the echolocation clicks of porpoises at 130 kHz travel only 500 m before becoming inaudible (Au et al. 1999). At the other extreme, sounds from fin whales (20 Hz) and low frequency energy from seismic airguns (5–100 Hz) can be detected thousands of km away under the right conditions (Nieukirk et al. 2012).

Geometric spreading losses: Sound levels from an omnidirectional point source in the water column are reduced with range, a process known as *geometric spreading loss*. As sound leaves the source, each spherical sound wave propagates outward and the sound energy is spread out over this ever-expanding sphere. The farther you are from the source, the lower the sound level you will receive. The received sound pressure levels at a recorder located a distance R (in m) from the source are $20\log_{10}R$ dB lower than the source level (SL) referenced to a standard range of 1 m. However, the sound cannot spread uniformly in all directions forever. Once the waves interact with the sea surface and seabed, the spreading becomes cylindrical rather than spherical and is limited to the cylinder formed by the surface and seabed with a lower range-dependent decay of $10\log_{10}R$ dB. Thus, the water depth is a key factor in predicting spreading losses and thus received sound levels. These spherical and cylindrical spreading factors provide limits for quick approximations of expected levels from a given source. In very shallow waters, sound rapidly attenuates if the water depth is less than a quarter of a wavelength (Urick 1983).

Reflection, scattering, absorption at the sea surface and seabed: If geometric spreading were the only factor governing sound attenuation in water, then at a given distance from a source, sound levels in shallow waters would almost always be higher than those in deep waters. In shallow water, however, the sound interacts with the seabed and sea surface more often than sound travelling in deep waters does, and these interactions reflect, absorb, and scatter the sounds. The sea surface behaves approximately as a pressure release boundary, where incident sound is almost completely reflected with opposite phase. As a result, the sum of the incident and reflected sounds at the sea-surface is zero. At the seabed, many types of interactions can occur depending on the composition of the bottom. Soft silt and clay bottoms absorb sound, sand and gravel bottoms tend to reflect sound like a partially reflective mirror, and some hard yet elastic bottoms, such as limestone, reflect some of the sound while absorbing some of the energy by converting the compressional waves to elastic shear waves.

Absorption by sea water: As sound travels through the ocean, some of the energy is absorbed by molecular relaxation in the seawater, which turn the acoustic energy into heat. The amount of absorption that occurs is quantified by an attenuation coefficient, expressed in units of decibels per kilometre (dB/km). This absorption coefficient depends on the temperature, salinity, pH, and pressure of the water, as well as the sound frequency. In general, the absorption coefficient increases with the square of the frequency, so low frequencies are less affected. The absorption of acoustic wave energy has a noticeable effect (>0.05 dB/km) at frequencies above 1 kHz. For example, at 10 kHz the absorption loss over 10 km distance can exceed 10 dB, as computed according to the formulae of François and Garrison (1982a, b).

4. Methods

4.1. Acoustic Data Acquisition

Underwater sound was recorded with four Autonomous Multichannel Acoustic Recorders (AMARs, JASCO; Figure 10). The AMARs were each fitted with M36 omnidirectional hydrophones (GeoSpectrum Technologies Inc., −164 re 1 V/µPa at 1 kHz sensitivity) and recorded continuously at 24-bit resolution at 64 kHz. Three AMARs stored acoustic data with three SD cards with 512 GB memory each (1.5 TB total), and one AMAR (Station 4) used seven SD-cards with 512 GB memory each (3.5 TB total). Appendix C provides details about the calibration procedure.

The deployment of the AMARs coincided with an inspection trip of the pre-laid anchors at the Artisan 1 drilling location by the Siem *Sapphire*. They were deployed on 3 Feb 2021, for an intended deployment duration of approximately 60 days. The deployment of one of the moorings is shown in Figure 11. The mooring at Station 3 released upon contact with the seafloor, potentially due to the lander striking a rock on the seafloor. It was immediately retrieved, and after sourcing a new weight plate and being re-configured, it was re-deployed on 24 Feb 2021. The retrieval of the moorings was conducted by Beach under guidance from JASCO on 3 Apr 2021.

The AMARs were deployed as part of a JASCO C-lander, with tandem acoustic releases (Figure 10). Each mooring consisted of:

- An AMAR G4 and battery packs,
- A Xeos Apollo Locator Beacon,
- Custom syntactic foam,
- A tandem acoustic release system (EdgeTech), and
- An anchor weight.

The AMAR hydrophones were protected by a hydrophone cage, which was covered with a nylon shroud to minimise noise artifacts from water flow (described in Section 3.1). The AMAR at Station 4 was configured with three hydrophones to allow for directional analysis (Thode et al. 2019).

Figure 10. The four C-Lander bottom moorings with Autonomous Multichannel Acoustic Recorders (AMAR G4s; JASCO) used for the project prior to loading onto the Siem *Sapphire*.

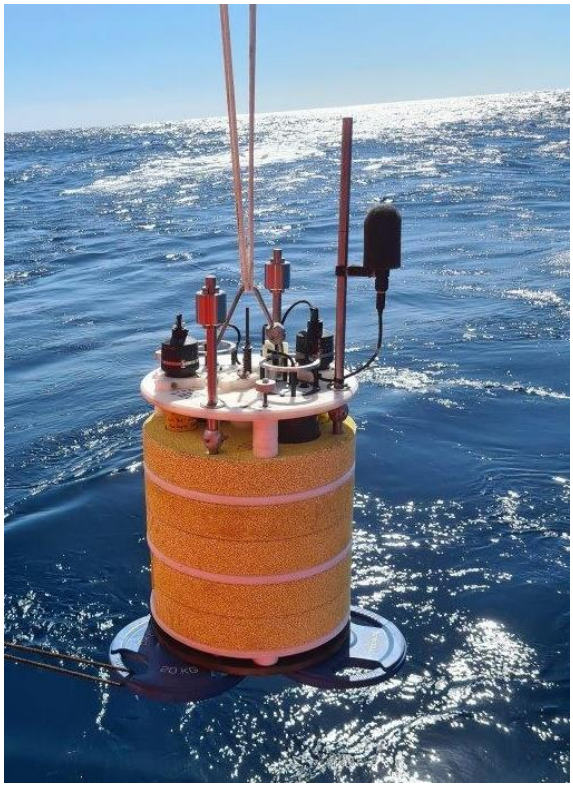


Figure 11. A single hydrophone C-Lander bottom mooring during deployment.

Table 7. Operation period, location, and depth of the Autonomous Multichannel Acoustic Recorders (AMARs) deployed at the Otway Project Area

Station	AMAR	Deployment	Recording duration (days)	Retrieval	Deployment duration (days)	Hydrophone details
1	628	3 Feb 2021	63	3 Apr 2021	58	One M36-V35-900
2	626	3 Feb 2021	63	3 Apr 2021	58	
3	627	24 Feb 2021	42	3 Apr 2021	37	
4	629	3 Feb 2021	63	3 Apr 2021	58	Three M36-V35-900

4.2. Data Analysis

The AMARs collected approximately 10.46 TB of acoustic data during this study, the equivalent of 1 year and 85 days JASCO used a specialised computing platform (PAMlab; JASCO) capable of processing acoustic data hundreds of times faster than real time. The system performed automated analysis of total ocean noise and sounds from vessels, other anthropogenic sources, and marine mammal vocalisations to provide context for the ambient ocean soundscape, anthropogenic contributors, and soniferous marine life (Section 3). Appendix D outlines the stages of the automated analysis.

4.2.1. Total Ocean Sound Levels

The data collected for the project spanned a frequency band between 10 Hz and 32 kHz. The goal of the total ocean sound analysis was to present the expansive data in a manner that documented the underwater sound conditions near Artisan-1 and allowed a comparison over time, along with external factors that change sound levels, such as weather and human activities.

The first stage of the total sound level analysis involves computing the peak sound pressure level and root-mean-square sound pressure level (SPL) for each minute of data collected. This reduced the data to a manageable size without compromising the value for characterising the soundscape (ISO 2017b, Ainslie et al. 2018, Martin et al. 2019). The SPL analysis was performed by averaging 120 fast-Fourier transforms (FFTs) that each include 1 s of data with a 50% overlap and that use the Hann window to reduce spectral leakage. The 1-minute average data were stored as power spectral densities (1 Hz resolution up to 455 Hz and millidecades frequency bands above 455 Hz) and summed over frequency to calculate decidecade band SPL levels. The millidecade band analysis approach is described in Martin et al. (2021). Millidecades are logarithmically spaced frequency bands but have a bandwidth equal to 1/1000th of a decade. The use of millidecades instead of 1 Hz frequency bands reduces the size of the spectral data by a large factor without compromising the use of the data.

Decidecade band levels are very similar to 1/3-octave-band levels. Table B-1 lists the decidecade band frequencies, and Table B-2 lists the decade-band frequencies. The decidecade analysis sums the frequency range from the millidecade bands (representing the frequency range 10 Hz to 32 kHz) in the power spectral density data to a manageable set of 45 bands. The decade bands further summarise the sound levels into four frequency bands for manageability. Detailed descriptions of the acoustic metrics and decidecade analysis can be found in Appendices B.1 and B.2.

In Section 5, the total sound levels are presented as:

- **Band-level plots**: These strip charts show the averaged received sound pressure levels as a function of time within a given frequency band. We show the total sound levels (across the entire recorded bandwidth from 10–32,000 Hz) and the levels in the decade bands of 10–100 (Decade A), 100–1000 (Decade B), 1000–10,000 (Decade C). The 10–100 Hz band is associated with pygmy blue whales, large shipping vessels, flow (or pseudo-noise) and mooring noise, and seismic survey impulses. Sounds within the 100–1000 Hz band are generally associated with the physical environment such as wind and wave conditions but can also include both biological and anthropogenic sources such as minke and humpback whales, fish, nearby vessels, seismic surveys, and pile driving. Sounds above 1000 Hz include high-frequency components of humpback whale sounds, odontocete whistles and echolocation signals, wind- and wave-generated sounds, and sounds from human sources at close range including pile driving, vessels, seismic surveys, and sonars.

- **Long-term Spectral Averages (LTSAs)**: These colour plots show power spectral density levels as a function of time (*x*-axis) and frequency (*y*-axis). The frequency axis uses a logarithmic scale, which provides equal vertical space for each decade increase in frequency and allows the reader to equally see the contributions of low and high-frequency sound sources. The LTSAs are excellent summaries of the temporal and frequency variability in the data.
- **Decidecade box-and-whisker plots**: In these figures, the 'boxes' represent the middle 50% of the range of sound pressure levels measured, so that the bottom of the box is the sound level 25th percentile (L_{25}) of the recorded levels, the bar in the middle of the box is the median (L_{50}), and the top of the box is the level that exceeded 75% of the data (L_{75}). The whiskers indicate the maximum and minimum range of the data.
- **Spectral density level percentiles**: The decidecade box-and-whisker plots are representations of the histogram of each band's sound pressure levels. The power spectral density data has too many frequency bins for a similar presentation. Instead, coloured lines are drawn to represent the L_{eq}, L_5, L_{25}, L_{50}, L_{75}, and L_{95} percentiles of the histograms. Shading is provided underneath these lines to provide an indication of the relative probability distribution. It is common to compare the power spectral densities to the results from Wenz (1962), which documented the variability of ambient spectral levels off the US Pacific coast as a function of frequency of measurements for a range of weather, vessel traffic, and geologic conditions. The Wenz levels are appropriate for approximate comparisons only because the data were collected in deep water, largely before an increase in low-frequency sound levels due to human activities (Andrew et al. 2011).
- **Daily sound exposure levels (SEL; $L_{E,24h}$)**: The SEL represents the total sound energy received over a 24 h period, computed as the linear sum of all 1-minute values for each day. It has become the standard metric for evaluating the probability of temporary or permanent hearing threshold shift in marine mammals. Long-term exposure to sound impacts an animal more severely if the sounds are within its most sensitive hearing frequency range. Therefore, during SEL analysis, recorded sounds are typically filtered by the animal's auditory frequency weighting function (Appendix E) before integrating to obtain SEL. For this analysis, the 10 Hz and above SEL were computed as well as the SEL weighted by the marine mammal auditory filters (NMFS 2018).

4.2.2. Directional Processing: Maximum Likelihood Beamforming

A maximum likelihood beamformer was applied to direction finding of the Station 4 acoustic data. For random continuous and impulsive signals, such as ship noise, anthropogenic noise, and marine animal vocalisations, the beamforming technique is reduced to Distance of Arrival (DOA) estimation. The sufficient statistic for random signals is the sampled covariance matrix,

$$\boldsymbol{C}(f,t) = \sum_{t}^{t+T_C} \boldsymbol{x}(f,t)\boldsymbol{x}^{+}(f,t)\,, \tag{1}$$

computed using N-dimensional DFT spectrums of array outputs, $\boldsymbol{x}(f,t) = [x_1(f,t), \dots, x_N(f,t)]^T$; where $x_n(f,t) = DFT\{x_n(t)\}$ is the short-time discrete Fourier Transform of the output of the *n*th hydrophone, $x_n(t)$. The output of the beamformer can be represented as:

$$P(f,t,\theta,\varepsilon) = \boldsymbol{w}^{+}(f,\theta,\varepsilon)\boldsymbol{C}(f,t)\boldsymbol{w}(f,\theta,\varepsilon)\,, \tag{2}$$

where $\boldsymbol{w}(f,\theta,\varepsilon) = [w_1(f,\theta,\varepsilon), \dots, w_N(f,\theta,\varepsilon)]^T$ is the N-dimensional vector of weighting coefficients of the array; and symbol "+" denotes transpose and complex conjugation, θ is the azimuth angle and ε is the estimation error. Figure 12 shows an example of the beamformer output in azimuth domain, $P(f,t,\theta,\varepsilon = 0)$. In this figure, colour represents the azimuth. The azimuth and elevation estimates of random signals can be computed for each frequency f and time slice t as:

$$\{\hat{\theta}(f,t), \hat{\varepsilon}(f,t)\} = arg \max_{\theta,\varepsilon} P(f,t,\theta,\varepsilon)\,. \tag{3}$$

An example of the directional information we obtain from this approach is shown in Figure 12. The performance of the beamformer is presented in Urazghildiiev and Hannay (2017). This method is most effective between 50 and 3000 Hz. The direction of true North was obtained using AIS data compared to vessel movements observed in the acoustic data.

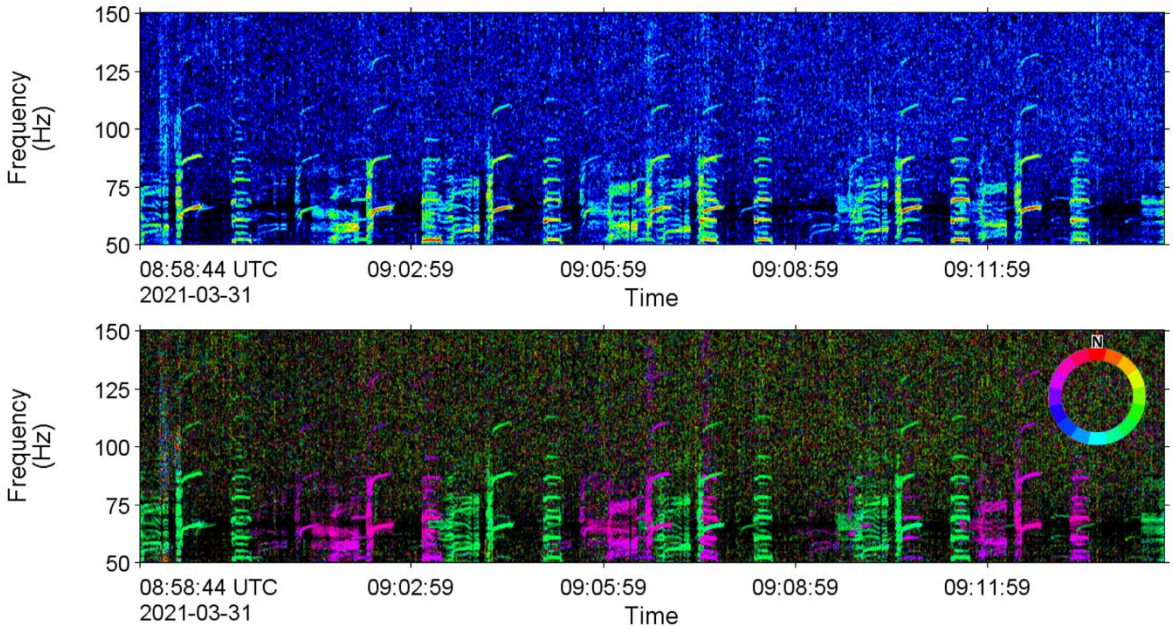


Figure 12. Spectrogram (top) versus directogram (bottom) of same data. In the directogram, colour represents the direction of arrival, with the colour legend shown in the top right corner. In the spectrogram, we cannot tell how many pygmy blue whales are vocalising; however, the directional information allows us to see that there were two animals singing.

4.2.3. Source Level Measurements with ShipSound

4.2.3.1. Overview

JASCO's ShipSound software monitors sound level measurements and AIS broadcasts from passing vessels. For vessel transiting scenarios, it identifies vessels that traverse a predefined transit area and then automatically extracts the corresponding acoustic data for analysis. It uses a vessel's broadcast speed together with a cepstral analysis of the Lloyd mirror pattern to determine the timing and location of closest point of approach (CPA) of the vessel's acoustic centre. For stationary sources, such as MODU or vessels in DP, it processes acoustic data within the specified period for the activity. ShipSound can analyse streaming data from a hydrophone in real time or, as in the case of the Beach Otway recorders, analyse archival hydrophone data downloaded from autonomous recorders. The vessel AIS data were based on Marine Traffic AIS data, vessel measurement logs, as well as client-provided data. AIS data were fed into the ShipSound system for vessel source level analysis. Environmental conditions, such as wind speed, were also recorded for each measurement. Ocean current data can be used to calculate speed through water (STW) from speed over ground (SOG) information received via AIS for each vessel measurement. However, current speed was not available in this project area, so STW was not calculated.

For transiting vessel measurements, the ANSI/ASA S12.64 data window is defined by the period over which the acoustic centre is within ±30° of the CPA. ShipSound can automatically determine the data window. For stationary sources, ShipSound determines the data window based on input specified time. ShipSound processes a single acoustic channel in 1-second periods stepped in 0.5-second intervals (Figure 13). Spectrum measurements are calculated using 1-second fast Fourier transforms, shaded using a Hanning window.

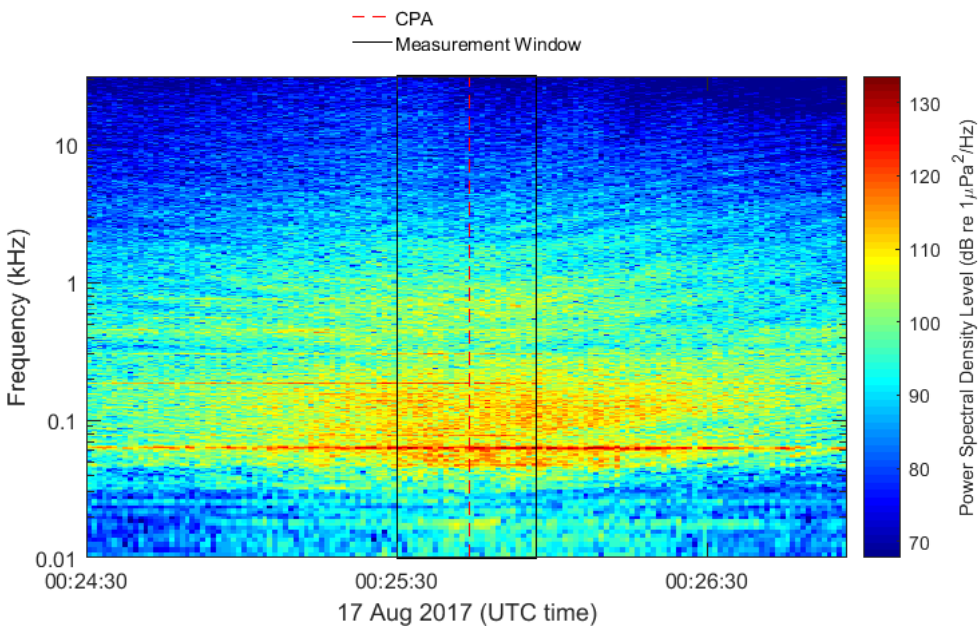


Figure 13. Spectrogram of a single transiting vessel measurement from ShipSound, showing the closest point of approach (CPA) time (dashed red line) and the measurement window (black box) used for calculating vessel source levels. The spectrogram shows the spectrum of the underwater sound pressure recorded on the hydrophone versus time and frequency.

ShipSound calculates two kinds of vessel source levels from the data window: Radiated Noise Level (RNL) and Monopole Source Level (MSL). RNL is equal to the measured sound pressure level, back-propagated according to the distance between a source and the hydrophone. The software applies the ANSI/ASA S12.64 Grade-A method for back-propagation distance: it determines instantaneous vessel range (R) in metres from the measurement hydrophone for each 1-second step within the data window. The RNL back propagation method of 20 x $Log_{10}(R)$ is applied to the spectra of each step separately. MSL is equal to the measured sound pressure level scaled according to a numerical acoustic propagation loss (PL) model that accounts for the effect of the local environment on sound propagation (i.e., sea-surface reflection, water column refraction and absorption, and bottom loss). Since no single acoustic model is applicable at all sampled ranges and frequencies, a hybrid TL model was used to calculate MSL as follows:

1. At frequencies less than 4 kHz and ranges less than 120 m, PL was calculated using a wavenumber integration model (Hannay et al. 2010, Jensen et al. 2011), which computes reflection coefficients for layered elastic media (Brekhovskikh 1980).
1. At frequencies less than 4 kHz and ranges greater than 240 m, PL was calculated using a wide-angle parabolic equation model (Collins 1993), modified to treat reflection losses for an elastic seabed using a complex-density equivalent fluid approximation (Zhang and Tindle 1995).
2. At frequencies less than 4 kHz and ranges between 120 m and 240 m, PL was calculated from the average of the parabolic equation and wavenumber integration models.
3. At frequencies greater than 4 kHz, PL was calculated using an image-method model (Brekhovskikh and Lysanov 2003), which accounts for surface and seabed reflection coefficients and frequency-dependent absorption (François and Garrison 1982b).

Average TL in each decidecade band was based on the mean propagation factor calculated at 50 frequencies, which were spaced logarithmically between the minimum and maximum band limits. Mean source depth for the MSL calculation was taken to be:

1. For vessel transit, source depth is defined as shaft depth minus 0.7 of the propeller radius. The stern propeller diameter of 4.2 m was used for the calculation.
2. For vessel in DP, since all the thrusters were operating and each are at different depths, the source depth is defined as 0.7 times vessel static draft reported on AIS.
3. For the MODU, the source depth is defined as half the static draft reported on AIS, which gives 11 m of the source depth.

The TL was smoothed by assuming the source depth had a Gaussian distribution, in a manner similar to Wales and Heitmeyer (2002), where the standard deviation was taken to be 30% of the source depth. Additional details regarding the automated source level measurement system are given in Hannay et al. (2016b). ShipSound also calculates background noise in each frequency band. For vessel measurements, ShipSound only accepts measured source band levels if they exceed the background levels by 3 dB or more. ShipSound corrects the band levels if they exceed background levels by 3–10 dB but rejects them if they are less than 3 dB above background. Adjusted and rejected levels are flagged in the database. Figure 14 summarises this approach.

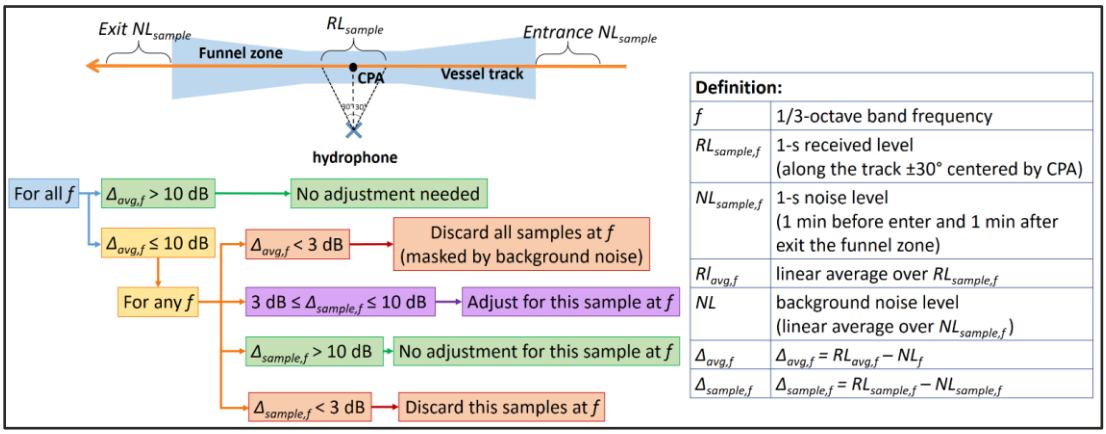


Figure 14. Background noise comparison and adjustment process.

PortListen includes a web-based user interface to access vessel and measurement information. A table view screen lets the user select and view multiple measurements by vessel criteria. This information, including broadband MSL and RNL source levels, can be exported as a spreadsheet. Vessel measurements are summarised in PDFs, presenting vessel and environment information, and the 1/3-octave-band MSL and RNL source levels. A manual quality review of every measurement was performed by an experienced analyst using the web-based interface. An analyst may reject a measurement because it contains interference from other vessels, has high levels of background noise, or if a vessel does not have constant speed and a straight track inside the data window.

MSL was the preferred metric for noise modelling because MSL back-propagation better accounts for the effect of the environment on vessel source levels (e.g., from absorption, surface, and seabed reflections) than RNL back-propagation. Measurements for vessel transits were obtained at different speeds, Ross's classical power law model (Ross 1976) was used to adjust the source levels to a reference speed. The change in source level (SL) to relative changes in speed:

$$\mathrm{SL} - \mathrm{SL}_{\mathrm{ref}} = C_v \times 10 \log_{10}\left(\frac{v}{v_{\mathrm{ref}}}\right). \quad (4)$$

In this equation, SL is the source level at speed v, $\mathrm{SL}_{\mathrm{ref}}$ is the source level at some reference speed v_{ref}, and $\mathrm{C_v}$ = 6, which is a coefficient corresponding to the slope of the curve.

4.2.3.2. MODU

The provided drill logs for the Artisan-1 well were reviewed to identify periods of activity defined as drilling, as this was the activity considered in the modelling study Koessler et al. (2020). Activities associated with mooring operations, cementing, installation of the Blow Out Preventer (BOP), or running casing were not considered. Twenty time periods for drilling were identified, and Long-term Spectral Averages (LSTAs) were created to review the data. From these data, 115 ten-minute time periods were identified as suitable or of interest for processing with ShipSound, listed in Table 8. Of these measurements, 70 were accepted (i.e., passed a manual quality review). Some measurements were rejected by the contamination of nearby vessels in DP (by checking both AIS data and noise spectrum). Source level measurements were matched with drill logs and the source levels were grouped by the drilling activities. The MSL was calculated over three different drilling depth ranges and presented as mean and maximum levels.

Table 8. Details of selected measurement periods for the *Ocean Onyx* mobile offshore drilling unit (MODU) and corresponding drill activities.

Drill activity	Date	Start	End	QC status
Spudded Artisan 1 at 2100 h. Drilled from 94.7 m (seabed) to 115 mMDRT. Pumped 100 bbl PHG sweep and took MWD survey at connection. Survey at 95.62 mMDRT: 0.82 deg inc, 13.97 deg azimuth. *Parameters*: 10–40 rpm, 3–5 kft-lbs torq, 8–10 klbs WOB, 600 gpm, 170 psi SPP	2021 Feb 23	10:05:00	10:15:00	Rejected
		10:25:00	10:35:00	Rejected
		10:55:00	11:05:00	Rejected
		11:00:00	11:10:00	Accepted
		11:25:00	11:35:00	Accepted
		11:45:00	11:55:00	Accepted
Continued drilling 26 × 42" hole from 115 to 171 m (SectionTD). Several small stringers encountered at 140 and 157 m. Pumped 100 bbl PHG sweep and took MWD survey at connection. Survey at 135 mMDRT: 0.5 deg inc. *Parameters*: 60 rpm, 3–5 kft-lb tq, 10 klbs WOB, 800–1,100 gpm, 400–550 psi SPP	2021 Feb 23	13:05:00	13:15:00	Accepted
		13:25:00	13:35:00	Accepted
		13:55:00	14:05:00	Accepted
		14:25:00	14:35:00	Rejected
		14:55:00	15:05:00	Accepted
		15:25:00	15:35:00	Accepted
		15:55:00	16:05:00	Rejected
		16:25:00	16:35:00	Rejected
		16:55:00	17:05:00	Accepted
		17:25:00	17:35:00	Accepted
		17:55:00	18:05:00	Rejected
		18:15:00	18:25:00	Accepted
Drilled 26 × 42” hole from 171 to 171.7 m with seawater at 60 rpm, 2 kft-lbs tq and 8 klbs WOB, 945 gpm with 400 psi.	2021 Feb 23	19:05:00	19:15:00	Accepted
		19:25:00	19:35:00	Rejected
		19:55:00	20:05:00	Rejected
Continued to drill 17.5” hole from 365 to 621 m with S/W and PHG sweeps. Pumped 50 bbls mid stand and spotted 100 bbls on around BHA at connections. Bubble watch in place on surface and ROV in TMS at LPWHH monitoring for shallow gas on sonar. *Parameters*: Flow: 1,100 gpm; Press: 2,240 psi; RPM: 80 surface. Total 201 Torque: 2–5 kft/lbs; WOB: 15–20 kft/lbs; Average ROP: 31 m/h P/U wt: 252 k, S/O 265 k, Rot 260 k.	2021 Feb 26	19:05:00	19:15:00	Rejected
		19:25:00	19:35:00	Accepted
		19:55:00	20:05:00	Accepted
		20:25:00	20:35:00	Accepted
		20:55:00	21:05:00	Accepted
		21:25:00	21:35:00	Accepted
		21:55:00	22:05:00	Accepted
		22:25:00	22:35:00	Accepted
		22:55:00	23:05:00	Rejected

		23:25:00	23:35:00	Accepted
	2021 Feb 27	23:55:00	00:05:00	Accepted
		00:25:00	00:35:00	Accepted
		00:55:00	01:05:00	Accepted
		01:25:00	01:35:00	Accepted
		01:55:00	02:05:00	Accepted
		02:25:00	02:35:00	Accepted
		02:55:00	03:05:00	Accepted
Held JHA for P/U and RIH with the 12 1/4"" BHA. Picked up and RIH with the 12 1/4"" BHA from surface to 50 m. Picked up the SLB motor and RIH from surface to 8.5 m. DSV confirmed that the motor configured with a 0.78 deg bend. Installed a non-ported, plunger type float valve into the motor-DSV on the drill floor and witnessed. Made up the SLB ARC-9 tool onto the motor and picked up the assembly above the RT and installed the 12 1/4"" PDC bit. Continued RIH with the BHA to 50 m.	2021 Mar 4	07:05:00	07:15:00	Rejected
		07:25:00	07:35:00	Rejected
		07:55:00	08:05:00	Rejected
		08:25:00	08:35:00	Rejected
		08:55:00	09:05:00	Rejected
		09:15:00	09:25:00	Accepted
Continued RIH with the 12 1/4"" BHA on 8 1/4"" DC. Picked up and made up 3x singles of 8 1/4"" DC, RIH from 50 to 80 m. Picked up and made up the 8"" Drilling Jar (with 2x 8 1/4"" DC) and continued RIH from 80-107 m. Picked up and made up the Jar Intensifier (with 2 x 8 1/4"" DC) and continued RIH from 107 to 135 m. Weight below the jars (40 klbs). Continued RIH with the 12 1/4"" BHA on 5 7/8"" Spiral HWDP. Made up 3x stand of 5 7/8"" spiral HWDP, RIH from 135 m to 220 mRT. Total string weight 65 klbs.	2021 Mar 4	09:35:00	09:45:00	Accepted
		09:55:00	10:05:00	Accepted
		10:25:00	10:35:00	Accepted
		10:55:00	11:05:00	Accepted
		11:25:00	11:35:00	Accepted
Continued RIH with the 12 1/4"" BHA on 5 7/8"" drill pipe from 220–278 m. Filled string on first stand of drill pipe.	2021 Mar 4	12:20:00	12:30:00	Accepted
		12:40:00	12:50:00	Accepted
PU off bottom 5 m. Staged up pump rate to drill out cement. Drilled out cement from 558 to 563 m. *Parameters*: ROP: 6.7 m/h; Flow: 750 gpm; Rotary: 30 rpm; SPP: 821 psi; WOB: 2–5 klbs; Off Bottom Tq: 1–2 kft-lbs; On Bottom Tq: 2–5 kft-lbs; ECD: 8.77 ppg	2021 Mar 4	16:35:00	16:45:00	Accepted
		16:50:00	17:00:00	Accepted
		17:05:00	17:15:00	Accepted
Continued drilling out cement with the 12 1/4"" BHA from 563 to 565 m. *Parameters*: ROP: 2.7 m/h; Flow 750 gpm; Rotary 30 rpm; SPP 821 psi; WOB-2–5 klbs; Off Bottom Tq 1–2 kft-lbs; On Bottom Tq 2–5 kft-lbs; ECD 8.77ppg	2021 Mar 4	18:15:00	18:25:00	Accepted
		18:30:00	18:40:00	Accepted
		18:45:00	18:55:00	Accepted
Continued to drill hard cement, float Collar and shoe track cement from 565 to 612 m (3 m from shoe) with seawater and 50 bbl PHG sweeps as required. *Parameters*: *ROP*: 13.4 m/h; Flow 800 gpm; Rotary 60 rpm; SPP 1000 psi; WOB 10–12 klbs; Off Bottom Tq 1–2 kft-lbs; On Bottom Tq 2–5 kft-lbs ECD 8.87 ppg; P/U weight 232 klbs; S/O weight 250 klbs; Rot weight 246 klbs	2021 Mar 4	19:05:00	19:15:00	Accepted
		19:25:00	19:35:00	Accepted
		19:55:00	20:05:00	Accepted
		20:25:00	20:35:00	Accepted
		20:55:00	21:05:00	Rejected
		21:25:00	21:35:00	Rejected
		21:55:00	22:05:00	Rejected
		22:25:00	22:35:00	Rejected
Drilled 12 1/4"" hole from 647 to 711 m. *Parameters*: Flow: 800 gpm; Press: 1,640 psi; RPM: 51 surface. 137 bit Torque: 1–3 kft/lbs; WOB: 4–5 kft/lbs; Average ROP: 21.3 m/h; P/U wt: 240 k, S/O 255 k, Rot 250 k. ESD: 10.1 ppg; ECD: 10.57 ppg	2021 Mar 5	10:05:00	10:15:00	Rejected
		10:25:00	10:35:00	Rejected
		10:55:00	11:05:00	Rejected
		11:25:00	11:35:00	Rejected
		11:55:00	12:05:00	Rejected
		12:25:00	12:35:00	Rejected

Drilled 12 1/4"" hole from 711 to 804 m. Parameters: Flow: 1002 gpm; Press: 2365 psi; RPM: 98 surface. 205 bit; Torque: 1–10 kft/lbs; WOB: 2–5 klbs; Average ROP: 46.5 m/h; P/U wt: 244 klbs, S/O 260 klbs, Rot 253 klbs. ESD: 10.18 ppg, ECD: 10.63 ppg	2021 Mar 5	13:05:00	13:15:00	Rejected
		13:25:00	13:35:00	Rejected
		13:55:00	14:05:00	Rejected
		14:25:00	14:35:00	Rejected
		14:45:00	14:55:00	Rejected
Drilled 12 1/4"" hole from 804 to 869 m. *Parameters*: *Flow*: 991 gpm; Press: 2390 psi; RPM: 99 surface. 206 bit; Torque: 2–5 kft/lbs; WOB: 2–5 kft/lbs; Average ROP: 18.57 m/h; P/U wt: 250 klbs, S/O 270 klbs, Rot 265 klbs. ESD: 10.2 ppg, ECD: 10.47 ppg	2021 Mar 5	15:35:00	15:45:00	Rejected
		15:55:00	16:05:00	Rejected
		16:25:00	16:35:00	Rejected
		16:55:00	17:05:00	Rejected
		17:25:00	17:35:00	Rejected
		17:55:00	18:05:00	Rejected
		18:25:00	18:35:00	Rejected
		18:45:00	18:55:00	Rejected
Drilled 12–1/4"" hole from 1,000 to 1,001 m. *Parameters*: Flow: 800 gpm; SPP: 2,650–2,800 psi; RPM: 79 surface/176 bit; Tq: Off 2 kft-lbs/On 5–15 kft-lbs. WOB: 5–20 klbs; Average ROP: 1 m/h; ESD: 10.11 ppg, ECD: 10.4 ppg; Slow drilling due to hard stringer. Boosted riser with 325 gpm at 75 psi.	2021 Mar 6	12:05:00	12:15:00	Accepted
		12:25:00	12:35:00	Accepted
		12:45:00	12:55:00	Accepted
Drilled ahead 12–1/4"" hole from 1,006 to 1014 m. *Parameters*: Flow: 900 gpm; SPP: 2,210 psi; RPM: 60 surface/170 bit; Tq: Off 1–2 kft-lbs/On 1–10 kft-lbs; WOB: 1–5 klbs P/U wt: 260 klbs, S/O wt: 280 klbs, Rot: 275 klbs; Average ROP: 8 m/h; ESD: 10.14 ppg, ECD: 10.52 ppg	2021 Mar 7	12:05:00	12:15:00	Accepted
		12:25:00	12:35:00	Accepted
		12:45:00	12:55:00	Accepted
Drilled ahead 12–1/4"" hole from 1,146 to 1,164 m. *Parameters*: Flow: 920 gpm; SPP: 2,330 psi; RPM: 100–120 surface/197–217 bit; Tq: Off 1–2 kft-lbs/On 1–10 kft-lbs; WOB: 1–5 klbs P/U wt: 266 klbs, S/O wt: 288 klbs, Rot: 285 klbs. Average ROP: 24 m/h. ESD: 10.39 ppg, ECD: 10.68 ppg	2021 Mar 7	18:20:00	18:30:00	Accepted
		18:40:00	18:50:00	Accepted
Drilled ahead 12–1/4"" hole from 1,433 to 1,545 m. *Parameters*: Flow: 1,000 gpm; Boost Pump: 250 gpm; SPP: 3,000 psi; RPM: 120 surface/217 bit; Tq: Off 1–2 kft-lbs/On 5–10 kft-lbs; WOB: 5–15 klbs P/U wt: 300 klbs, S/O wt: 325 klbs, Rot: 315 klbs; Average ROP: 18.6 m/h; ESD: 11.18 ppg, ECD: 11.37 ppg; Offline: Displaced the Boost line and flushed the MGS utilising the boost pump-total of 20 strokes pumped (10 bbls). At 1,510 m MW over the shakers recorded at 10.7 ppg (ESD-10.88 ppg). Ceased centrifuging and weighted up the mud with additions of barite. MW at 1543 m recorded at 11.1 ppg.	2021 Mar 8	13:05:00	13:15:00	Accepted
		13:25:00	13:35:00	Accepted
		14:25:00	14:35:00	Accepted
		14:55:00	15:05:00	Accepted
		15:25:00	15:35:00	Accepted
		15:55:00	16:05:00	Accepted
		16:25:00	16:35:00	Accepted
		16:55:00	17:05:00	Accepted
		17:25:00	17:35:00	Accepted
		17:55:00	18:05:00	Accepted
		18:25:00	18:35:00	Accepted
		18:45:00	18:55:00	Accepted
Continued to drill 12–1/4” hole from 1,623 to 1,655 m. *Parameters*: Flow: 805 gpm; SPP: 2,135 psi; RPM: 120 surface/206 bit; Tq: Off 1–2 kft-lbs/On 4–15 kft-lbs; WOB: 5–15 klbs; P/U wt: 310 klbs, S/O wt: 330 klbs, Rot: 325 klbs; Average ROP: 11m/h including connections; ESD: 11.13 ppg; ECD: 11.39 ppg	2021 Mar 9	08:45:00	08:55:00	Rejected
		09:10:00	09:20:00	Rejected
		09:40:00	09:50:00	Accepted
		10:10:00	10:20:00	Accepted
		10:40:00	10:50:00	Accepted

		11:10:00	11:20:00	Accepted
		11:35:00	11:45:00	Accepted
Continued to drill 12–1/4” hole from 1,830 to 1,851 m. *Parameters*: Flow: 920 gpm; SPP: 2,750 psi; RPM: 100 surface/198 bit; Tq: Off 1–2 kft-lbs/On 3–10 kft-lbs.; WOB: 10–20 klbs; P/U wt: 320 klbs, S/O wt: 345 klbs, Rot: 325 klbs; Average ROP: 19.3 m/h including connections. ECD: 11.40 ppg; ROP controlled to max 30 m/h for flow rate, mud rheology and surface equipment.	2021 Mar 10	01:35:00	01:45:00	Accepted
		01:55:00	02:05:00	Accepted
		02:25:00	02:35:00	Accepted
		02:45:00	02:55:00	Accepted

4.2.3.3. Vessels

ShipSound was used to process a total of 4 vessel DP measurements collected from Station 2, five vessel transit measurements collected from Station 2, and 16 vessel transit measurements collected from Station 4. All these measurements were accepted measurements. Details of the measurements were shown in Table 9. The classical power law model of Ross (1976) was used to calculate source levels to a referenced speed (Section 4.2.3.1), with the speed scaling coefficients C_v = 6 proposed by Ross (1976).

Table 9. Vessel measurements collected from Stations 2 and 4.

MMSI	Vessel	Activity	Speed (kn)	CPA time	CPA distance (m)	QC status
Station 2						
257544000	SIEM *SAPPHIRE*	DP	0.6	2021 Feb 4 01:23:00	162.3	Accepted
257544000	SIEM *SAPPHIRE*	DP	0.6	2021 Feb 4 01:38:30	183.9	Accepted
257544000	SIEM *SAPPHIRE*	DP	0.6	2021 Feb 4 01:47:30	182.6	Accepted
257544000	SIEM *SAPPHIRE*	DP	0.8	2021 Feb 4 02:00:00	185.6	Accepted
257544000	SIEM *SAPPHIRE*	Transit	8	2021 Feb 4 02:32:48	189.4	Accepted
257544000	SIEM *SAPPHIRE*	Transit	6.9	2021 Feb 4 08:10:52	165.6	Accepted
257544000	SIEM *SAPPHIRE*	Transit	7.7	2021 Feb 4 08:29:14	165.5	Accepted
257544000	SIEM *SAPPHIRE*	Transit	6.5	2021 Feb 4 08:45:40	184.6	Accepted
257544000	SIEM *SAPPHIRE*	Transit	7.9	2021 Feb 4 09:01:22	160.7	Accepted
Station 4						
257544000	SIEM *SAPPHIRE*	Transit	9.3	2021 Feb 5 15:02:57	187.6	Accepted
257662000	SIEM *AQUAMARINE*	Transit	9.3	2021 Feb 15 02:33:00	147.7	Accepted
257544000	SIEM *SAPPHIRE*	Transit	6.3	2021 Feb 15 04:19:19	128.9	Accepted
257709000	SIEM *TOPAZ*	Transit	8.8	2021 Feb 17 06:50:05	121.5	Accepted
257709000	SIEM *TOPAZ*	Transit	10.4	2021 Feb 20 08:38:36	118.2	Accepted
257709000	SIEM *TOPAZ*	Transit	10	2021 Feb 23 17:11:01	113.8	Accepted
257662000	SIEM *AQUAMARINE*	Transit	14.7	2021 Feb 25 10:35:02	133.4	Accepted
257662000	SIEM *AQUAMARINE*	Transit	10.1	2021 Feb 27 18:45:40	118.9	Accepted
257544000	SIEM *SAPPHIRE*	Transit	9.9	2021 Mar 1 05:41:49	108.7	Accepted
257544000	SIEM *SAPPHIRE*	Transit	8.6	2021 Mar 3 21:48:03	120.6	Accepted
257662000	SIEM *AQUAMARINE*	Transit	8.2	2021 Mar 8 05:01:58	120.1	Accepted
257662000	SIEM *AQUAMARINE*	Transit	9.4	2021 Mar 10 21:56:02	35.3	Accepted
257709000	SIEM *TOPAZ*	Transit	6.6	2021 Mar 13 00:22:58	118.7	Accepted
257544000	SIEM *SAPPHIRE*	Transit	8.7	2021 Mar17 12:14:59	124.8	Accepted
257662000	SIEM *AQUAMARINE*	Transit	10.1	2021 Mar 21 06:29:56	144.5	Accepted
257662000	SIEM *AQUAMARINE*	Transit	11.1	2021 Mar 23 09:51:01	131.0	Accepted

4.2.4. Fit Equations

For each minute of data at each station, the analysis provided the range and received sound levels, with the metric of interest being SPL. To be able to understand the trends of the change in sound levels with range, and to interpolate the sound levels in between the measurement locations, it is required to obtain equations which represent the measurement data. The data were fit using linear models from 'R' (R Core Team 2020) of the form:

$$\text{model} = lm(\text{SPL} \sim \log(range) + range)\,. \tag{5}$$

The tilde (~) is used to separate the left- and right-hand sides in a model formula. The models provide the following values that fit the data:

- An intercept,
- Coefficients multiplied by log10(range), and
- Range.

The coefficient of log10(range) may be interpreted as the average geometric spreading for the environment. The coefficient of range may be interpreted as an additional loss term that models the effects of reflection and scattering when the sound interacts with the surface and seabed. This simple model formulation is valid when:

- There are no systematic changes to the geometric spreading–i.e., it is not valid very close to the Ocean Onyx and associated vessel movements within the 500 m zone where DP is required,
- The seabed geoacoustic properties are approximately constant, and
- The water depth does not significantly vary.

The models were used to predict the most likely data values for ranges of 20 to 6000 m, as well as the 90% prediction interval. The top of the prediction interval corresponds to the value that is greater than 95% of the measured data. The distance to 95% of the measured data is not the same as the $R_{95\%}$ range determined through modelling.

The coefficient of determination (r2) was used to assess the validity of the fit, with fits where r2 was less than 0.85 being flagged as suspect.

The per-minute SPL at each station was influenced by both the operations centred on the Ocean Onyx and sound sources close to each station. To create a model which focuses on understanding the trends of the change in sound level with range in relation to activities closes to Station 1, the data was split into three different sets. The data was therefore presented in the following ways:

- All per-minute SPL data from Station 1–3 while the Ocean Onyx was operational (01:00 12 Feb through until 00:00 25 Mar)
- Per-minute SPL data for per-minute SPL at Station 1 between 130 and 150 dB re 1µPa, thereby excluding periods when high noise levels, likely due to a close support vessel, or support vessels operating at high thrust levels which might skew the fit.
- Per-minute SPL data for per-minute SPL at Station 1 over 150 dB re 1µPa, to examine the trends in change in sound level with range for notably loud period at Station 1.
- The low-frequency weighted per-minute SPL can be adjusted by $10*\log_{10}(T)$, where T is 1440 (the number of minutes in 24 h) to determine the daily SEL for each of the three data sets.

4.2.5. Vessel Noise Detection

Outside of the specific individual vessel analysis requirements, vessels are detected in two steps (Martin 2013):

1. Detect constant, narrowband tones produced by a vessel's propulsion system and other rotating machinery (Arveson and Vendittis 2000). These sounds are also referred to as tonals. We detect the tonals as lines in a 0.125 Hz resolution spectrogram of the data (8 s of data, Hann window, 2 s advance).
2. Assess the SPL for each minute in the 40–315 Hz shipping frequency band, which commonly contains most sound energy produced by mid-sized to large vessels. Background estimates of the shipping band SPL and system-weighted SPL are then compared to their mean values over a 12 h window, centred on the current time.

Vessel detections are defined by the following criterion (Figure 15):

1. SPL in the shipping band (40–315 Hz) is at least 3 dB above the 12 h mean for the shipping band for at least 5 min.
2. AND at least three shipping tonals (0.125 Hz bandwidth) are present for at least 1 min per 5 min window. Tonals are difficult to detect during turns and near the closest points of approach (CPA) due to Lloyds' mirror and Doppler effects.
3. AND SPL in the shipping band is within 12 dB of the system weighted SPL.

The duration where these constraints are valid is identified as a period with shipping present. A 10 min shoulder period before and after the detection period is also included in the shipping period. The shipping period is searched for the highest 1 min SPL in the vessel detection band, which is then identified as the CPA time. This algorithm is designed to find detectable shipping, meaning situations where the vessel noise can be distinguished from the background. It does not identify cases of two vessels moving together or cases of continuous noise from stationary platforms, such as oil and gas drilling and dynamic positioning operations. Those situations are easily identified from tools such as the daily SEL and long-term spectral average figures.

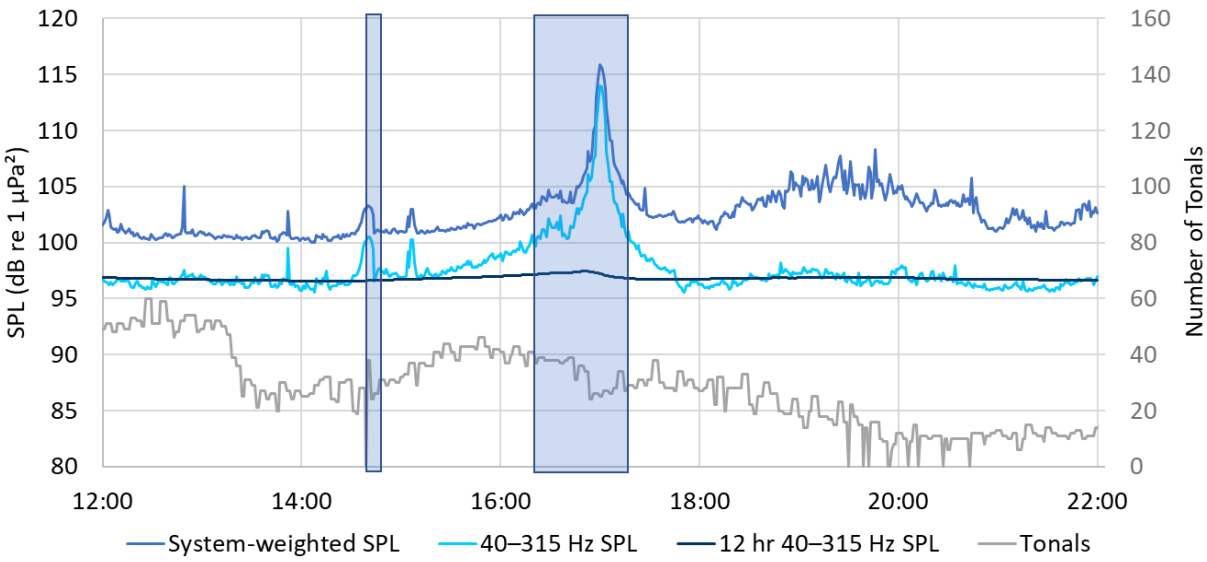


Figure 15. Example of broadband and 40–315 Hz band sound pressure level (SPL), as well as the number of tonals detected per minute as a vessel approached a recorder, stopped, and then departed. The shaded area is the period of shipping detection. Fewer tonals are detected at the vessel's closest point of approach (CPA) at 17:00 because of masking by broadband cavitation noise and due to Doppler shift, that affects the tone frequencies.

4.2.6. Seismic Survey Event Detection

Seismic pulse sequences were looked for using correlated spectrogram contours. The processing calculated spectrograms using a 300 s long window with 4 Hz frequency resolution and a 0.05 s time resolution (Reisz window). All frequency bins were normalised by their medians over window the 300 s window. The detection threshold was set to three times the median value at each frequency. If pulses were found, contours were created by joining the time-frequency bins above threshold in the 7–1000 Hz band using a 5 × 5 bin kernel. Contours 0.2–6 s in duration with a bandwidth of at least 60 Hz are then further analysed.

The process is used to create an "event" time series by summing the normalised value of the frequency bins in each time step that contained detected contours. The event time series is auto correlated to look for repeated events. The correlated data space was normalised by its median, and a detection threshold of 3 was applied. Peaks larger than their two nearest neighbours can be identified, and the list of peaks searched for entries with a set repetition interval. The allowed spacing between the minimum and maximum time peaks was 4.8–65 s, which captures the normal range of seismic pulse periods. If at least six regularly spaced peaks occur, the original event time series is searched for all peaks that match the repetition period within a tolerance of 0.25 s. The duration of the 90% SPL window of each peak can be determined from the originally sampled time series, and pulses more than three second long were rejected.

Despite the flexibility of the detection process, no impulses were detected, and thus no results are presented for seismic survey impulses.

4.2.7. Marine Mammal Detection Overview

We used a combination of automated detector-classifiers (referred to as automated detectors) and manual review by experienced analysts to determine the presence of sounds produced by marine mammals in the acoustic data. First, a suite of automated detectors was applied to the full data set (Appendices D.1 and D.2). Second, a subset (0.5%) of acoustic data was selected for manual analysis of marine mammal acoustic occurrence. The subset was selected based on automated detector results via our Automatic Data Selection for Validation (ADSV) algorithm (Kowarski et al. 2021) (Appendix D.3). Third, manual analysis results were compared to automated detector results to determine automated detector performance (Appendix D.4). Finally, hourly marine mammal occurrence plots were created that incorporated both manual and automated detections as well as automated detector performance metrics to provide a reliable representation of marine mammal presence in the acoustic data (Section 5.7). These marine mammal analysis steps are summarised here and described in detail in Appendix D.

4.2.7.1. Automated Click Detection

Odontocete clicks are high-frequency impulses ranging from 5 to over 150 kHz (Au et al. 1999, Møhl et al. 2000). We applied an automated click detector to the acoustic data to identify clicks from sperm whales and delphinids. This automated detector is based on zero-crossings in the acoustic time series. Zero-crossings are the rapid oscillations of a click's pressure waveform above and below the signal's normal level (e.g., Figure D-1). Zero-crossing-based features of automatically detected events are then compared to templates of known clicks for classification (see Appendix D.1 for details).

4.2.7.2. Automated Tonal Signal Detection

Tonal signals are narrowband, often frequency-modulated, signals produced by many species across a range of taxa (e.g., baleen whale moans and delphinids whistles). They range predominantly between 15 Hz and 20 kHz (Steiner 1981, Berchok et al. 2006, Risch et al. 2007). The automated tonal signal detector identified continuous contours of elevated energy and classified them against a library of marine mammal signals (see Appendix D.2 for details).

4.2.7.3. Evaluating Automated Detector Performance

JASCO's suite of automated detectors are developed, trained, and tested to be as reliable and broadly applicable as possible. However, the performance of marine mammal automated detectors varies across acoustic environments (e.g., Hodge et al. 2015, Širović et al. 2015, Erbs et al. 2017, Delarue et al. 2018). Therefore, automated detector results must always be supplemented by some level of manual review to evaluate automated detector performance. Here, we manually analysed a subset of 5 min acoustic files for the presence/absence of marine mammal acoustic signals via spectrogram review in JASCO's PAMlab software. A subset (0.5%) of acoustic data from each station was selected via ADSV for manual review (Appendix D.3).

To determine the performance of the automated detectors at each station per 5 min acoustic file, the automated and manual results (excluding files where an analyst indicated uncertainty in species occurrence) were fed into an algorithm that calculates precision (*P*), recall (*R*), and Matthew's Correlation Coefficient (*MCC*) (see Appendix D.4 for formulas). *P* represents the proportion of files with detections that are true positives. A *P* value of 0.90 means that 90% of the files with automated detections truly contain the targeted signal, but it does not indicate whether all files containing acoustic signals from the species were identified. *R* represents the proportion of files containing the signal of interest that were identified by the automated detector. An *R* value of 0.90 means that 90% of files known to contain a target signal had automated detections, but it says nothing about how many files with automated detections were incorrect. An MCC is a combined measure of *P* and *R*, where an MCC of 1.00 indicates perfect performance–all events were correctly detected. The algorithm determines a per file automated detector threshold (the number of automated detections per file at and above which automated detections were considered valid) that maximizes the MCC.

The acoustic occurrence of each species (both automated and manual results) was plotted using JASCO's Ark software as time series showing presence/absence by hour over each day of the recording period. Automated detector performance metrics are provided alongside these figures and should be considered wen interpreting results.

4.3. Modelling Validation

In order to validate the modelled predictions presented in Koessler et al. (2020), the calculated Monopole Source Levels (MSLs), which were computed from measured data using the method outlined in Section 4.2.3, were used to update the acoustic model inputs for the scenarios from Koessler et al. (2020). This process yielded new ranges to thresholds based on in-situ measured data. Only the scenarios for Artisan (i.e., Scenario 5 – 8 in Koessler et al. (2020)) were consider for a validation exercise.

The following process was implemented for updating the inputs to the acoustic model.

1. Update the sound speed profile to use predictions from the Global Ice Ocean Prediction System (GIOPS) forecasting system for the period when the data was acquired. Determine and median profile to best represent potential propagation conditions over the February 2021 – March 2021 periods.
2. Update the decidecade MSLs and MSL source depth based on the results of the ShipSound analysis presented in Section 5.5.
3. Re-run all propagation modelling, gridding and radii calculations as detailed in Koessler et al. (2020) with these updated input parameters for all scenarios.

During this process, the data fit plots discussed in Section 4.2.4 and presented Section 5.3 were reviewed in the context of results from previous modelled scenarios and newly acquired MSLs to infer the appropriateness of the seabed selection for the Artisan development area and its effect on the distances to thresholds. Further detail can be found in Section 6.2.

5. Results

5.1. Soundscape Characterisation

Long-term spectra averages, power spectral density, and decidecade band box plots are shown in Figure 16 for all stations during the period the *Ocean Onyx* was moored (01:00 12 Feb through 00:00 25 Mar 2021), with the decade band percentile levels presented in Table 10.

The same plots are presented for two examples of operational activity at the *Ocean Onyx* (Table 8), Figure 17, from 5 Mar 2021, which included resupply and drilling operations, and Figure 18, from 26 Feb 2021, for a drilling operations with support vessels further from the *Ocean Onyx*.

5.1.1. Spectrograms and Statistical Analysis

The spectrogram and band-level plots for all stations (Figure 16) provide an overview of the sound variability in time and frequency presenting an overview of presence and level of contribution from different sources. Short-term events appear as vertical stripes on the spectrograms and spikes on the band level plots. Long-term events affect (increasing or decreasing accordingly) the band level over the event period and appear in the spectrograms as horizontal bands of colour.

The most prominent feature to note is the decrease in sound level with distance from the drill rig. Stations 1 and 2, located 336 m and 1132 m from the platform respectively, demonstrate elevated sound levels across all frequencies, but particularly at frequencies under approximately 2000 Hz. This is consistent with the bands most typically impacted by seismic and pressure fluctuations, as well as vessel noise, as can be seen in the Wenz curves of Figure 9. At these two stations, the L_{50} and above, as well as the L_{mean} percentiles exceed the upper limit of the Wenz curve across all frequencies. At Stations 3 and 4, located 5 km and 25 km from the platform respectively, the sound levels are much reduced. Station 3 still receives some sound energy emitted from the platform and associated operations, whereas these contributions are not notable within Station 4's soundscape, as can be seen in the two right side panels of Figure 16. The soundscape of these two stations is more influenced by vessel traffic, apparent by the 'ripples' in the L_{mean} percentiles between 40 and approximately 100 Hz, which are due to narrowband tones produced by vessel propulsion systems.

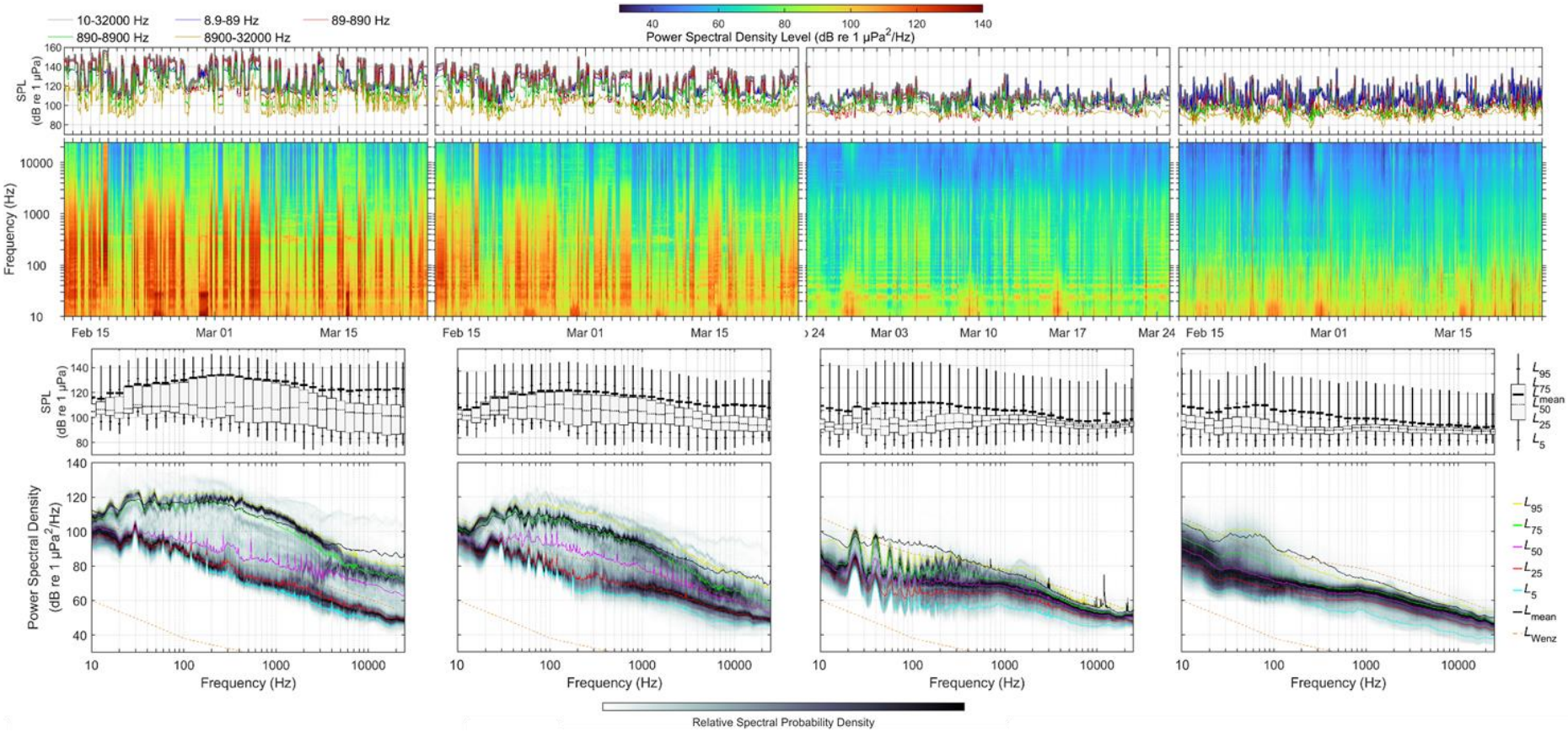


Figure 16. *Entire Ocean Onyx moored period*: (Top row) In-band sound pressure level (SPL) and spectrogram (or long-term spectral average; LTSA) of underwater sound, (bottom row) percentiles and mean of decidecade sound pressure level (SPL) and percentiles and probability density (grayscale) of 1-min power spectral density levels, by station compared to the Wenz curve limits (coloured lines) of prevailing noise (Wenz 1962), for 01:00 12 Feb through until 00:00 25 Mar, for Stations 1, 2 and 4, or from 12:00 24 Feb for Station 3.

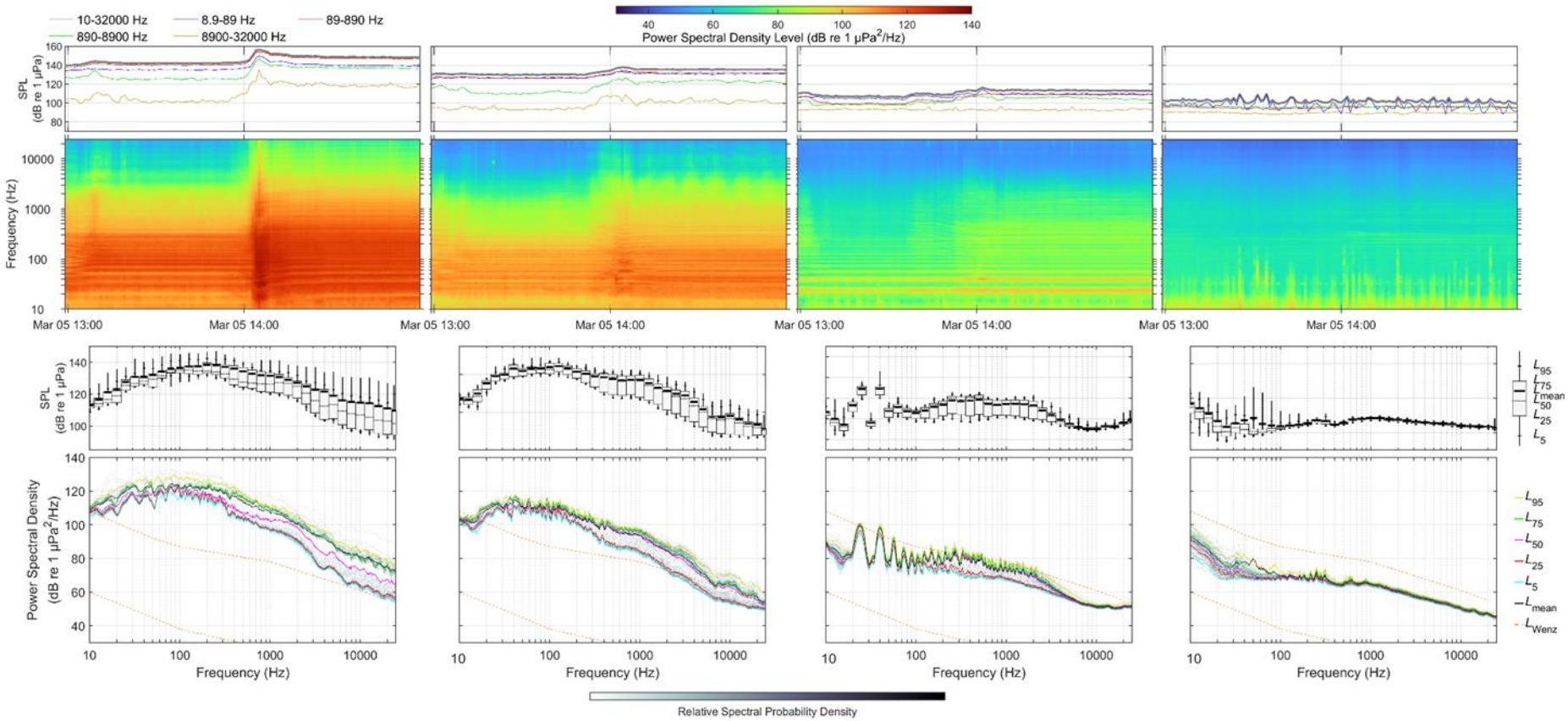


Figure 17. *Drilling and vessel operation 5 Mar 2021*: (Top row) In-band sound pressure level (SPL) and spectrogram (or long-term spectral average; LTSA) of underwater sound, (bottom row) percentiles and mean of decidecade sound pressure level (SPL) and percentiles and probability density (grayscale) of 1-min power spectral density levels, by station for a drilling period on 5 Mar 2021 (Table 8) which included resupply and support vessels, compared to the Wenz curve limits (coloured lines) of prevailing noise (Wenz 1962).

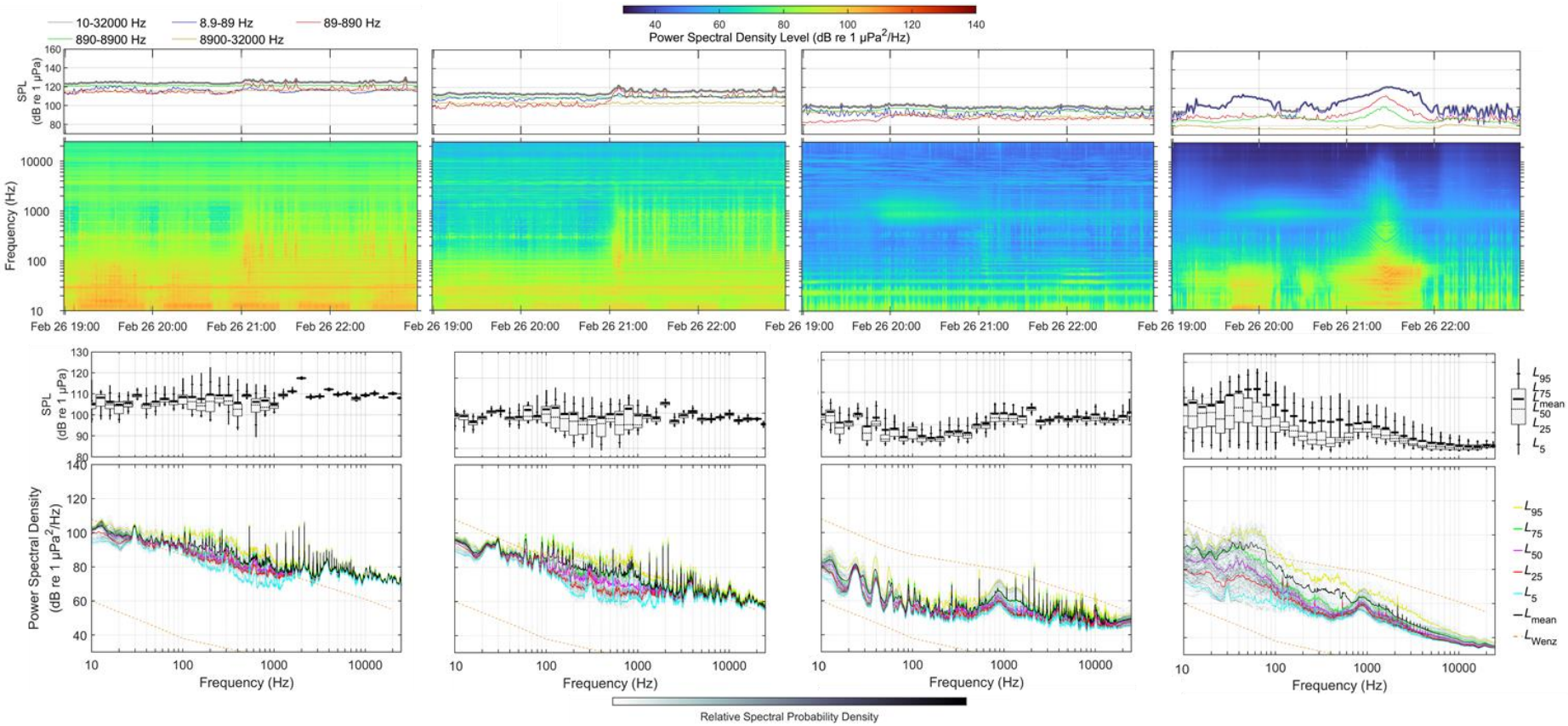


Figure 18. *Drilling operations 26 Feb 2021*: (Top row) In-band sound pressure level (SPL) and spectrogram (or long-term spectral average; LTSA) of underwater sound, (bottom row) percentiles and mean of decidecade sound pressure level (SPL) and percentiles and probability density (grayscale) of 1-min power spectral density levels, by station for a drilling period on 5 Mar 2021 compared to the Wenz curve limits (coloured lines) of prevailing noise (Wenz 1962).

Table 10. Statistical a0nalysis of sound levels while *Ocean Onyx* was moored, 01:00 12 Feb through until 00:00 25 Mar 2021, for Stations 1, 2, and 4, or from 12:00 24 Feb 2021 for Station 3. SPL units: dB re 1 µPa.

Sound level statistic	Station	Sound level				
		10–32000 Hz	8.9–89 Hz	89–890 Hz	890–8900 Hz	8900–32000 Hz
Minimum	1	107.6	105.1	102.2	92.5	85.5
	2	101.1	98.5	92.6	83.1	82.2
	3	91.9	83.5	80.1	82.6	84.4
	4	86.6	79.3	80.2	80.9	77.2
L_5	1	112.9	110.7	106.7	98.1	90.7
	2	107	105.1	98.4	94.5	89.5
	3	97.5	89.4	87.6	91.5	89
	4	96.3	88.4	87.3	86.4	82
L_{25}	1	117.1	114.2	110.6	103.7	94.3
	2	112	109.1	104.1	101.9	93.5
	3	102.1	94.4	94.1	96.8	92
	4	101.1	95.5	92.6	92.6	87.7
L_{50}	1	124.6	118.3	119.7	119.3	109.6
	2	121.3	116.2	117.4	110.7	99.5
	3	106.4	101.3	99.2	100.2	93.7
	4	104.5	101.8	95.9	96.2	90.9
L_{75}	1	143.8	135.4	142.4	132.6	117.2
	2	132.1	127.8	129.5	119.9	105.8
	3	111.3	107.8	105.7	103.5	95
	4	110.1	109.2	99.1	98.7	93.1
L_{95}	1	149	139.4	147.8	139.8	124.3
	2	141.3	133.6	138.9	130.2	114.1
	3	115.8	111.8	111.3	110.2	98.8
	4	120.7	120	109.8	102	98.2
Maximum	1	159	155	156.5	152.6	151.3
	2	158.6	154.2	156.2	147.9	139.3
	3	153.4	150	150.4	139.8	137.4
	4	153.6	153.1	145.1	138.6	128.6
Mean	1	144	135.5	142.3	135.7	129.6
	2	133.4	127.5	131.3	123.6	116
	3	117.8	114	114.8	106.8	99.9
	4	118.3	117	111.7	103.2	95.1

5.1.2. Frequency Weighted Sound Exposure Levels

The perception of underwater sound depends on the hearing sensitivity of the receiving animal in the frequency bands of the sound. Hearing sensitivity in animals, however, varies over the frequency band of their hearing (the hearing curve (audiogram) usually resembling a U-shaped form). The frequency range of hearing and hearing sensitivity differ between species, resulting in the fact that different species will perceive underwater sound differently. Auditory (frequency) weighting functions (Appendix E) are applied to account for this difference as they reflect an animal's ability to hear a sound, emphasising the frequency band of best sensitivity over frequencies animals do not hear well. Figure 19 shows the difference between perceived ambient noise by low-, mid- and high frequency cetaceans. Similar to the figures in Section 5.1.1, Figure 19 demonstrates the decrease in sound levels with distance from the drilling platform. Station 4 is more exposed to general shipping traffic within the shipping lanes when compared to Station 3 (Figure 3), and thus its daily SEL were more variable, being less influenced or driven by activity close to the *Ocean Onyx* more by the frequency of shipping traffic. The low-frequency cetacean weighted daily SEL for all stations, along with the thresholds for PTS and TTS (Section 2.6) are shown in Figure 20.

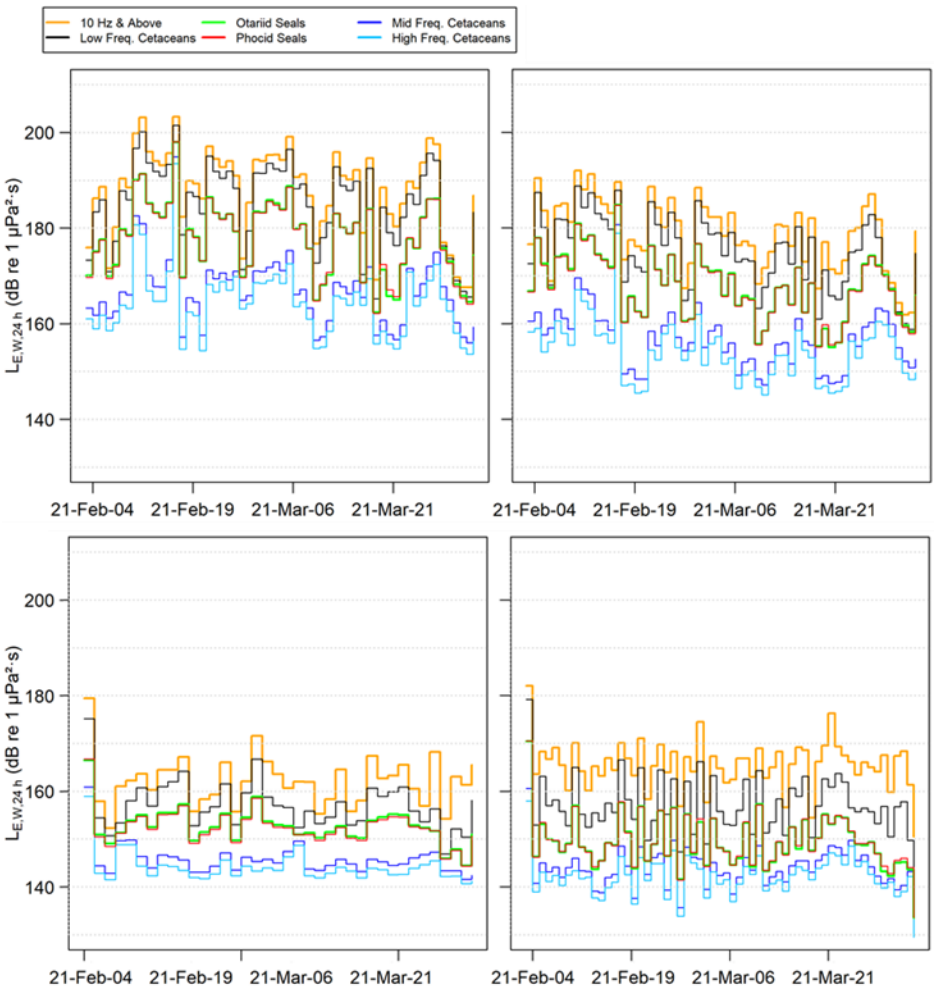


Figure 19. Auditory frequency weighted ambient noise (10 Hz and above) over the measurement period shown as daily sound exposure levels (SEL) (NMFS 2018). (Top left to right) Stations 1 and 2 and (bottom left to right) Stations 3 and 4. Locations are provided in Table 4.

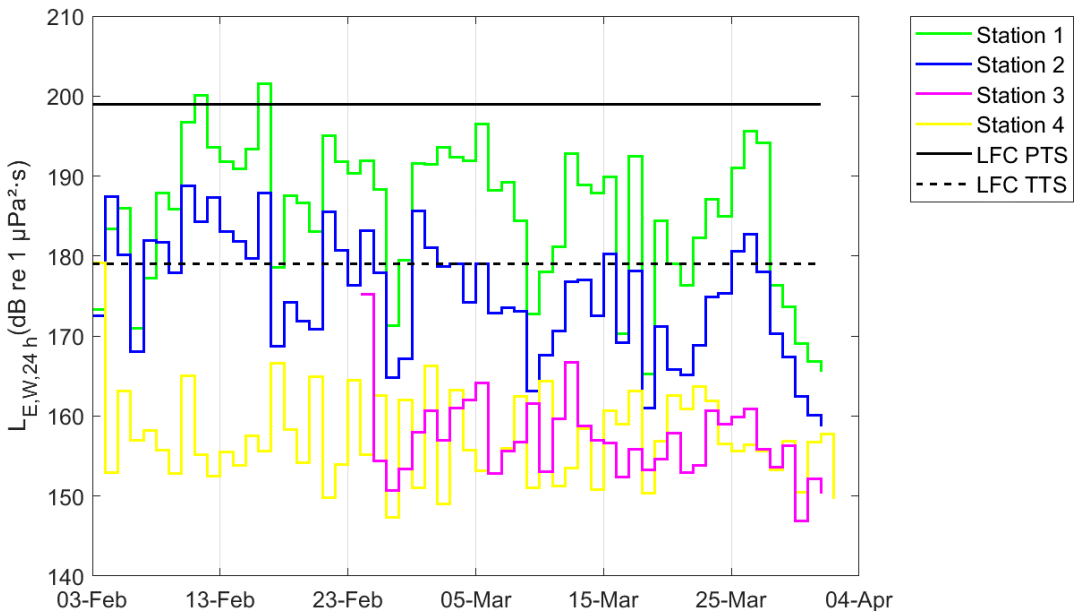


Figure 20. Daily low-frequency cetacean (LFC) weighted sound exposure levels (SEL) (NMFS 2018) at each station (composite created from Figure 19, station locations provided in Table 4), including thresholds for permanent threshold shift (PTS) and temporary threshold shift (TTS) (Table 6).

5.2. Environmental Correlations

The environmental conditions during the drilling period, specifically the wave height and wind speed, were compared to sound pressure levels during the drilling period in the 20 Hz, 80 Hz, 630 Hz, 3150 Hz, and 125000 Hz decidecade bands in the correlograms in Figure 21. Correlograms offer two ways to visualise correlations between two variables: the upper right panels show the scatter plot between each variable pair, and the bottom left show the strength of the correlation both by amount of the circle filled and depth of the colour. Blue represents a positive correlation, and red a negative. The four panels show Stations 1 to 4, respectively. The impact of wind and wave conditions on underwater soundscape is generally above 100 Hz, as shown in Figure 9 (Wenz 1962).

Stations 1 and 2, at 336 and 1132 m from the drill rig respectively, show very little correlation of sound level at any band with wind or wave conditions. At these stations, the soundscape was dominated by drilling operations. As the distance to the station increases, i.e., for Stations 3 and 4 at 5 and 25 km, the wind speeds and wave heights have a positive correlation with sound levels, although the relationship with wind speed is much stronger than that for wave height.

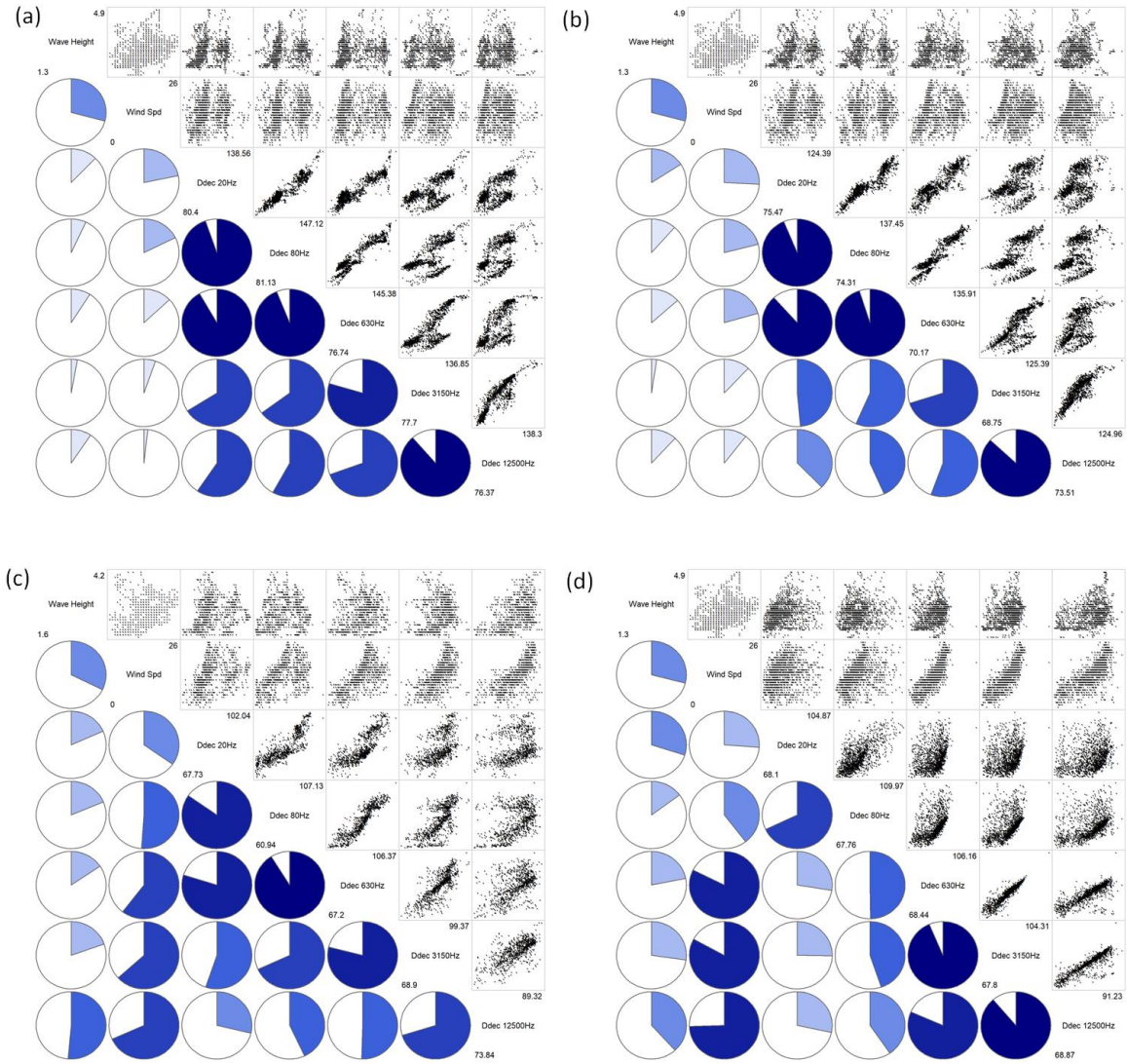


Figure 21. Correlogram comparing weather conditions to sound levels in five specified decidecade bands for (a) Station 1 at 300 m; (b) Station 2 at 1 km; (c) Station 3 at 5 km; and (d) Station 4 channel 1 at 25 km.

5.3. Data Fits

The per-minute SPL data from Station 1–3 while the Ocean Onyx was moored (01:00 12 Feb through until 00:00 25 Mar 2021) was analysed according to the methods detailed in Section 4.2.4, with the results presented in Figures 22 and 23. These fits were used to gain an understanding of the propagation loss environment, and to complete the validation analysis (Section 4.3), as discussed in Section 6.2.

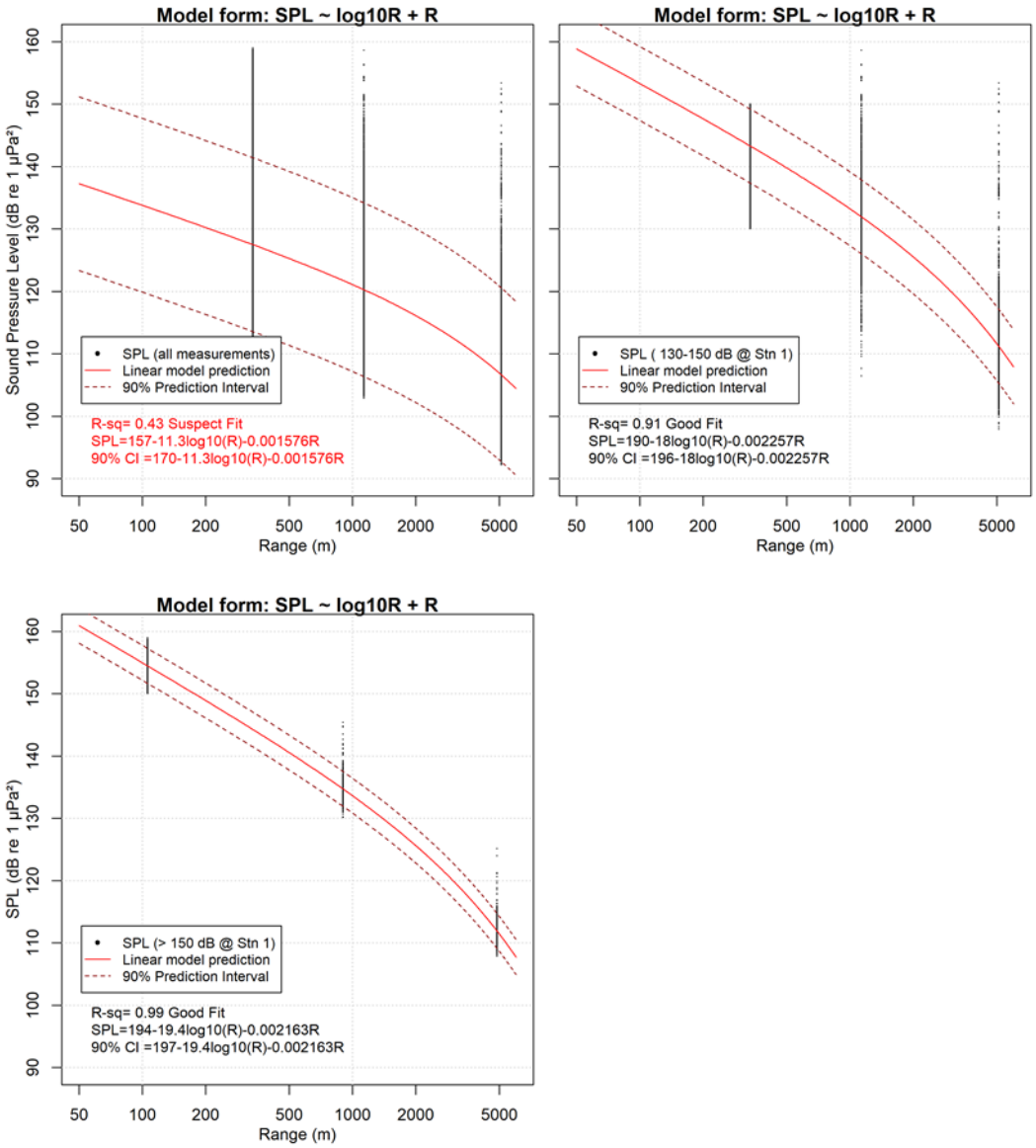


Figure 22. Per-minute sound pressure level (SPL) plotted against range for Stations 1–3, for the entire period the *Ocean Onyx* is present (top-left), levels at Station 1 between 130 and 150 dB re 1µPa (top-right), and levels at Station 1 above 150 dB re 1µPa (bottom-left).

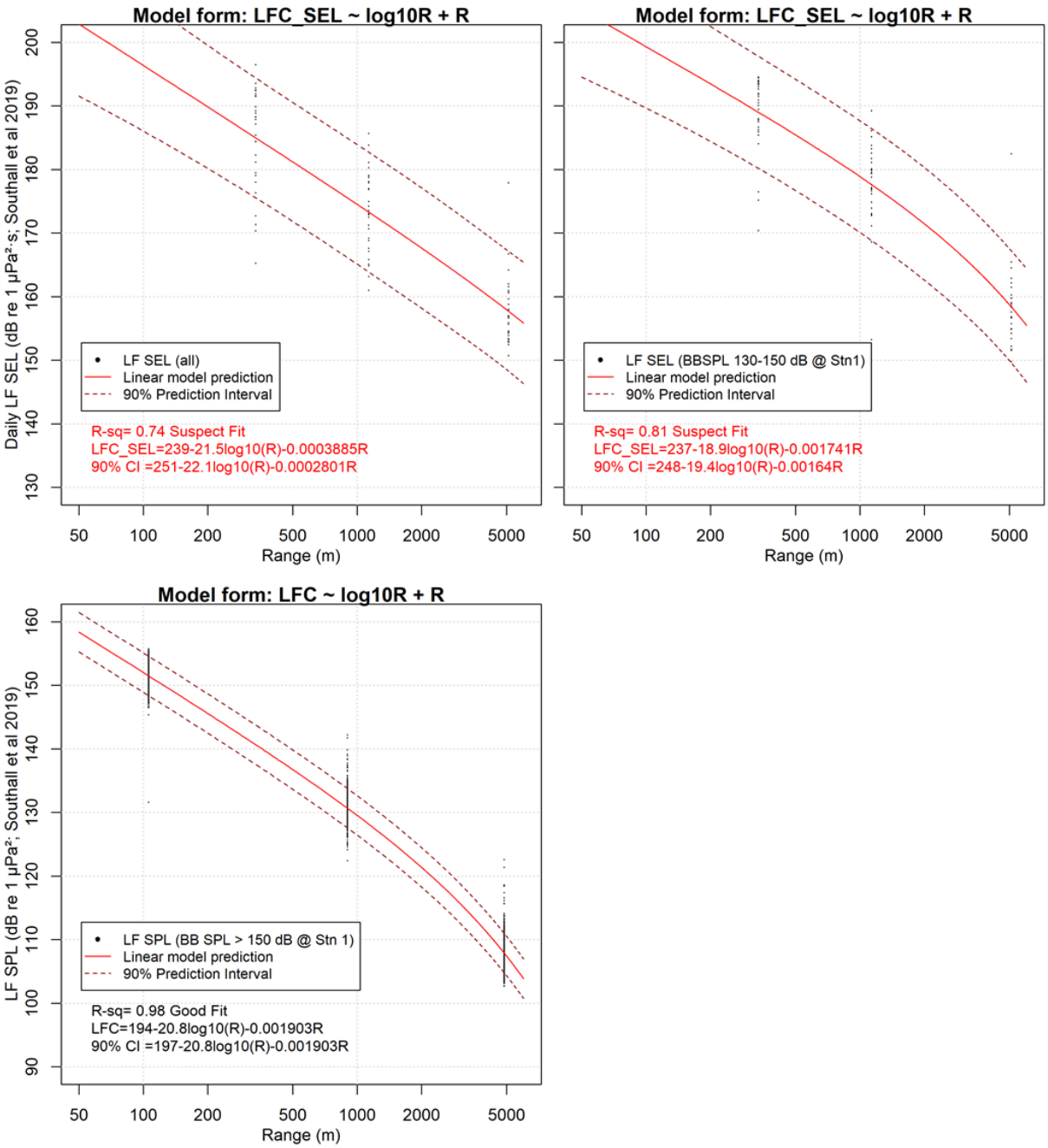


Figure 23. Daily low-frequency cetacean weighted sound exposure level (SEL) (calculated from frequency weighted per-minute sound pressure level (SPL)) plotted against range for Stations 1–3, for the entire period the *Ocean Onyx* is present (top-left), levels at Station 1 between 130 and 150 dB re 1µPa (top-right), and levels at Station 1 above 150 dB re 1µPa (bottom-left).

5.4. Drilling Operations

A detailed analysis was undertaken on two file snippets from Station 1, focused on correlating the acoustic signals to the drilling logs, and providing details on some of the signals observed in the acoustic data.

5.4.1. Snippet 1

A snippet of data from Station 1 for 22 Feb 2021 from 14:14:37 was examined to look for alignment between the acoustic data and the drilling logs to provide a detailed insight into the noise producing sources. The drilling log for this period stated:

> Continued drilling 26" x 42" hole from 115m to 171m (SectionTD). Several small stringers encountered at 140m and 157m. Pumped 100bbl PHG sweep and took MWD survey at connection. Survey @ 135mMDRT: 0.5deg inc.
>
> Parameters: 60rpm, 3-5kft-lb tq, 10klbs WOB, 800-1,100gpm, 400-550psi SPP

The spectrogram of the entire wav file is shown in Figure 24, with a shorter timescale and more focused frequency range shown in Figure 25, both showing components above 10 Hz only. In this data, drilling tonals with a spacing of 155 Hz were identified (Figure 26), and the analysis of the very low frequency tonals (Figure 27) clearly shows a 1 Hz tonal, which aligns with the 60 rpm drilling speed in the logs. A steady state pump operating at centre frequencies of 2992 Hz and 3062 Hz, with a strong correlation to high frequency harmonics (Figure 28). In this snippet there were three unstable narrowband noise sources present which are likely due to the drilling operations. This is considered likely due to their harmonic spacing under varying loads of operations. Tonals indicate that something, potentially the drill bit or the main aperture rod, is rotating between 52 and 74 RPM. This appears unrelated to the steady state pumps, which are likely high pressure pumps that fluctuate very little over time or load. During this recording, a vessel was also present although it did not appear to be operating under DP.

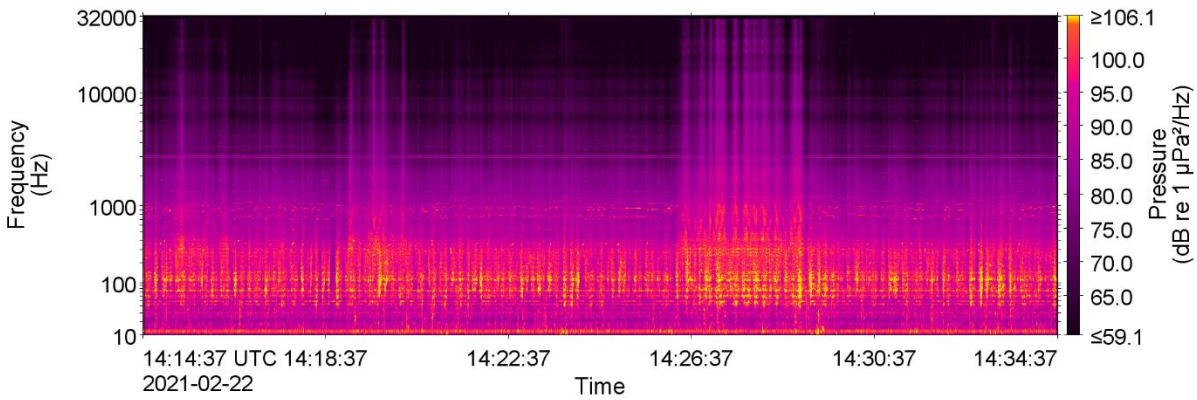


Figure 24. Spectrogram of 20 minutes of drilling operations on 22 Feb 2021 from 14:14:37 at Station 1(0.2 Hz frequency resolution, 1 s time window, 0.5 s time step, Hamming window).

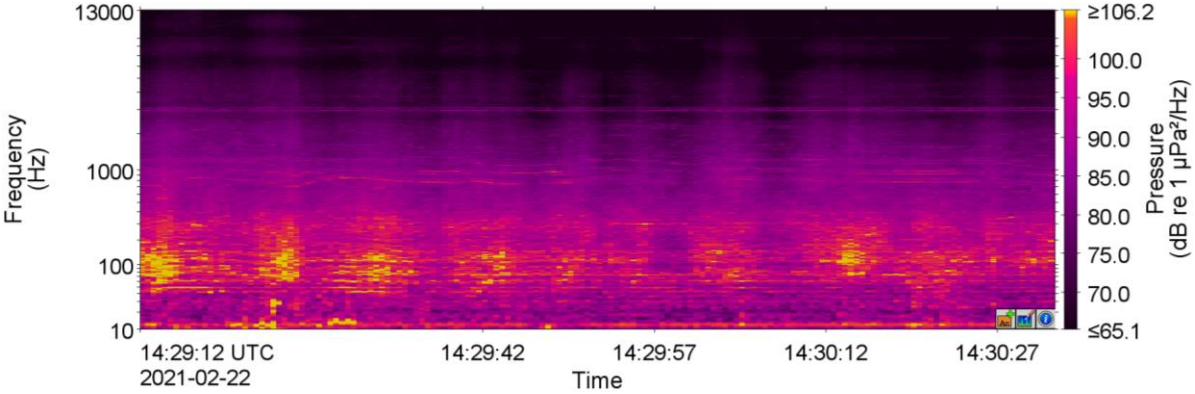


Figure 25. Spectrogram of 80 s minutes of drilling operations on 22 Feb 2021 from 14:29:12 at Station 1(0.2 Hz frequency resolution, 1 s time window, 0.5 s time step, Hamming window).

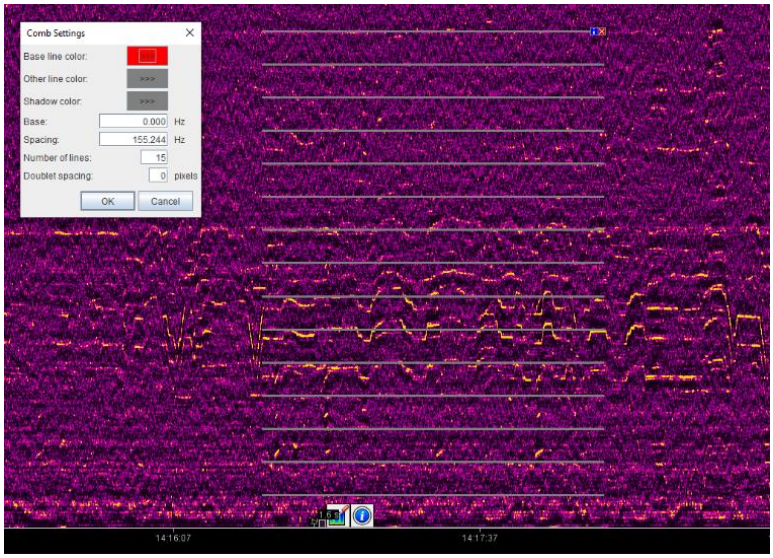


Figure 26. Drilling tonals, spaced at 155 Hz

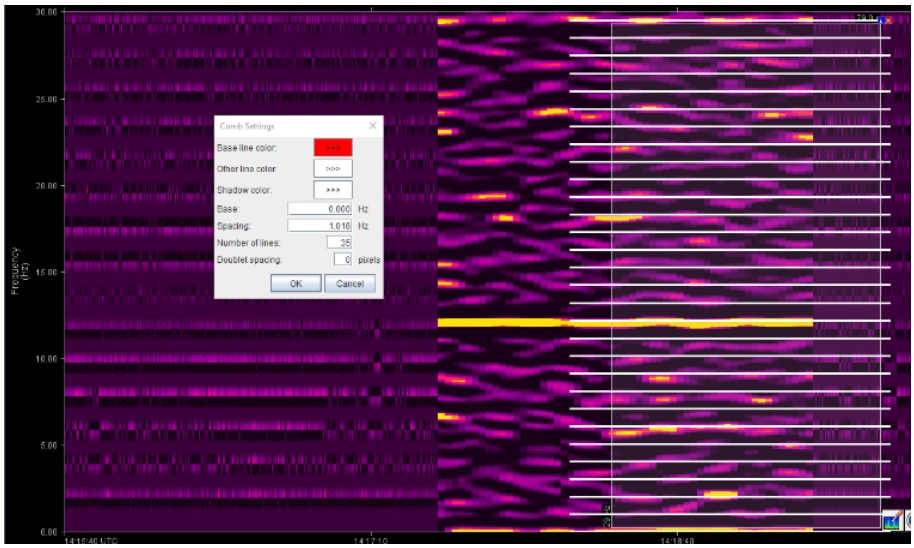


Figure 27. Very low frequency tonal analysis correlates with 60 rpm drilling speed

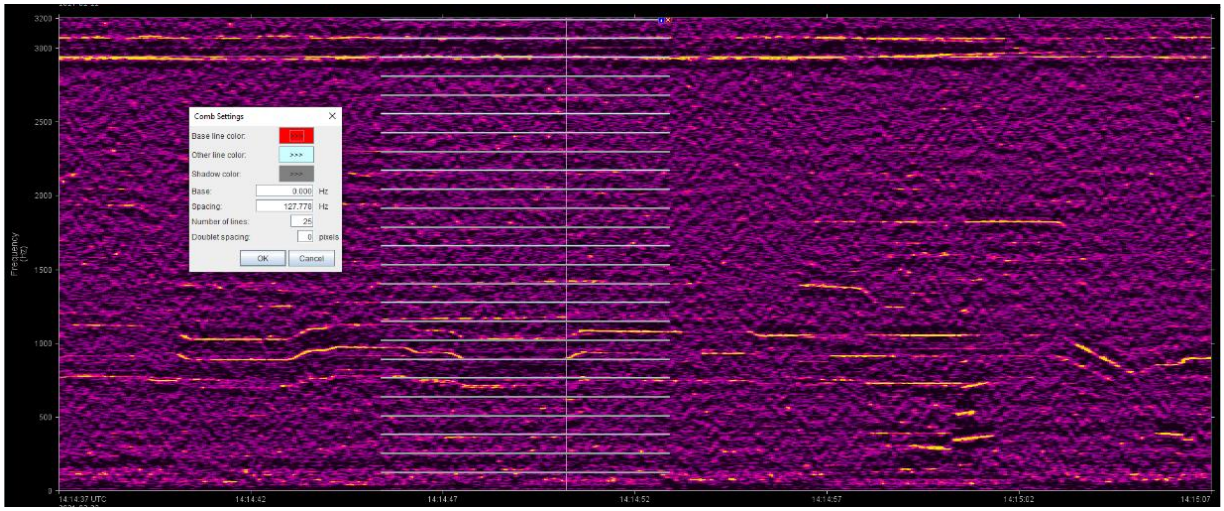


Figure 28. Example of correlation between harmonics and load on main pump with centre frequencies of 2992 and 3062 Hz. The example also shows the diesel generators with engine firings rates fluctuating between 149 and 152 Hz while under hotel load from *Ocean Onyx*.

5.4.2. Snippet 2

A snippet of data from Station 1 for 08 Mar 2021 from 18:14:40 was examined to look for alignment between the acoustic data and the drilling logs to provide a detailed insight into the noise producing sources. The drilling log for this period stated:

> Drilled ahead 12-1/4" hole from 1,433m to 1,545m.
> Parameters:
> Flow: 1,000gpm, Boost Pump-250gpm, SPP: 3,000psi, RPM: 120 surface/217 bit
> Tq: Off 1-2kft-lbs/On 5-10kft-lbs. WOB: 5-15klbs P/U wt: 300klbs, S/O wt: 325klbs, Rot: 315klbs. Average ROP: 18.6m/hr
> ESD: 11.18ppg, ECD: 11.37ppg
> Offline: Displaced the Boost line and flushed the MGS utilising the boost pump - total of 20 strokes pumped (10bbls).
> At 1,510m MW over the shakers recorded at 10.7ppg (ESD-10.88ppg).
> Ceased centrifuging and weighted up the mud with additions of barite. MW at 1543m recorded at 11.1ppg.

The spectrogram of the entire wav file is shown in Figure 29, with a shorter timescale and more focused frequency range shown in Figure 30, both showing components above 10 Hz only. In this snippet there is no secondary source, such as a support vessel, present, just the *Ocean Onyx*. The narrowband tonals below 200 Hz indicate that the revolutions-per-minute fluctuate between 178 and 220 rpm, this aligns with data pins 9, 13 and 16 in Figure 31, along with various higher frequency harmonics. A second low-frequency rotating source, with a speed of 120.6 rpm was detected, Figure 32, and it demonstrates no apparent relationship between the 1.63:1 reduction ratio present in the low frequency spectrum to the other source. These frequencies align with information provided in the drill logs.

The data indicates various generator (diesel gensets and pumps) running in multiple configurations. All appear to be running in a steady-state fashion with varying loads, apparent through the fluctuations in frequency. Two distinct gensets are noted in particular as running hotel load, as they are more stable than the others which are likely being used for the *Ocean Onyx* drilling operations, and thus having changing requirements which changes their load. The tone at 3 kHz which is consistent without fluctuation, shown clearly in Figure 34, is probably a high-pressure pump which does not fluctuate with power draw, as no banding (harmonics) are observed, the motor is not a pole motor.

Figure 35 shows three distinct gensets (one tonal each) with accompanying cylinder firing rates throughout the spectrogram. These appear related to *Ocean Onyx* drilling operations as there are no secondary contacts on spectrogram (such as vessels) and the tonals fluctuate with power draw over time.

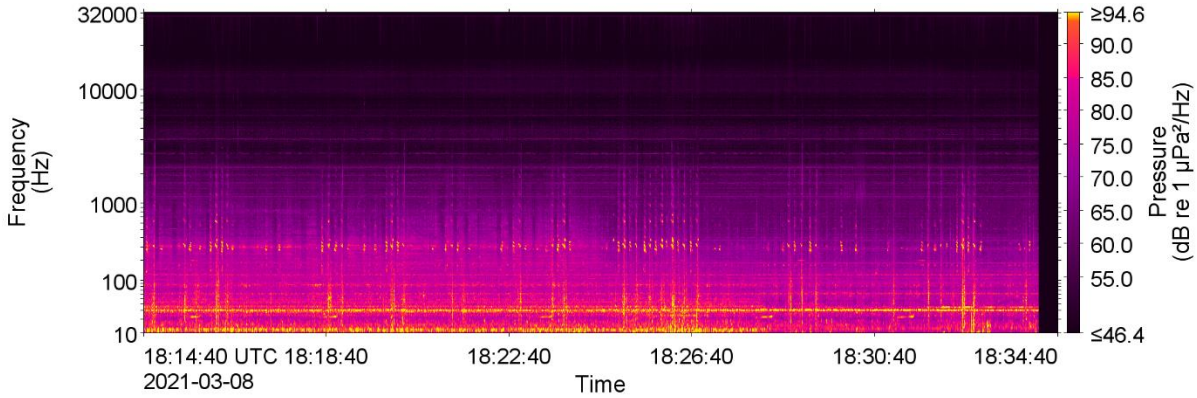


Figure 29. Spectrogram of 20 minutes of drilling operations on 08 Mar 2021 from 18:14:40 at Station 1(0.2 Hz frequency resolution, 1 s time window, 0.5 s time step, Hamming window).

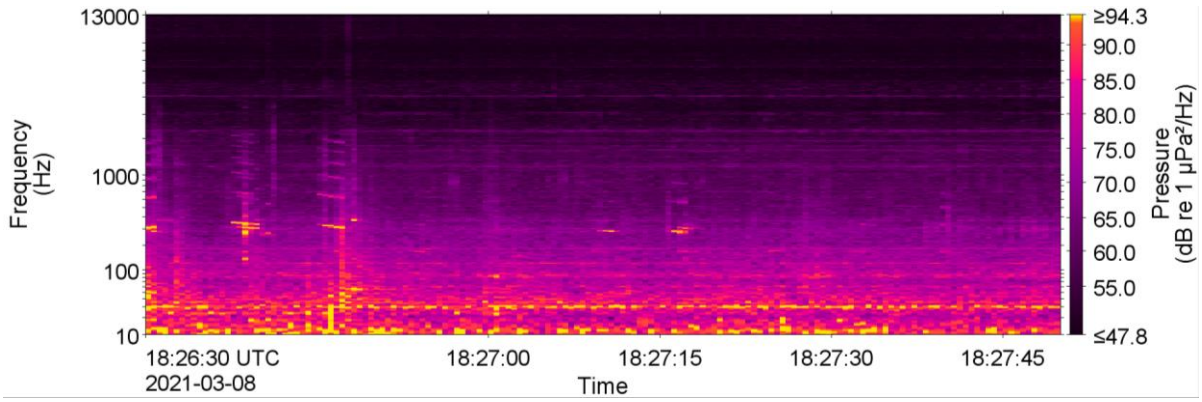


Figure 30. Spectrogram of 80 s of drilling operations on 08 Mar 2021 from 18:26:30 at Station 1(0.2 Hz frequency resolution, 1 s time window, 0.5 s time step, Hamming window).

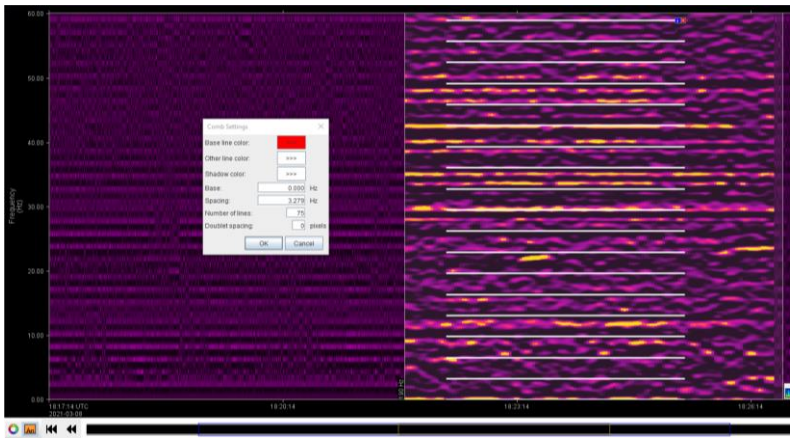


Figure 31. Low frequency analysis – rotating source contribution from first source.

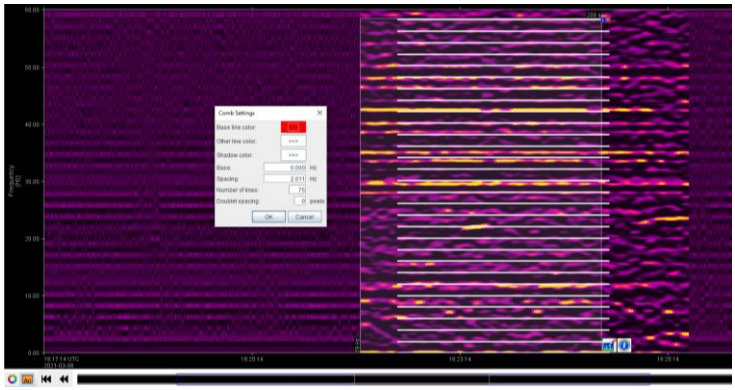


Figure 32. Low frequency analysis – rotating source contribution from second source rotating at 120.6 rpm.

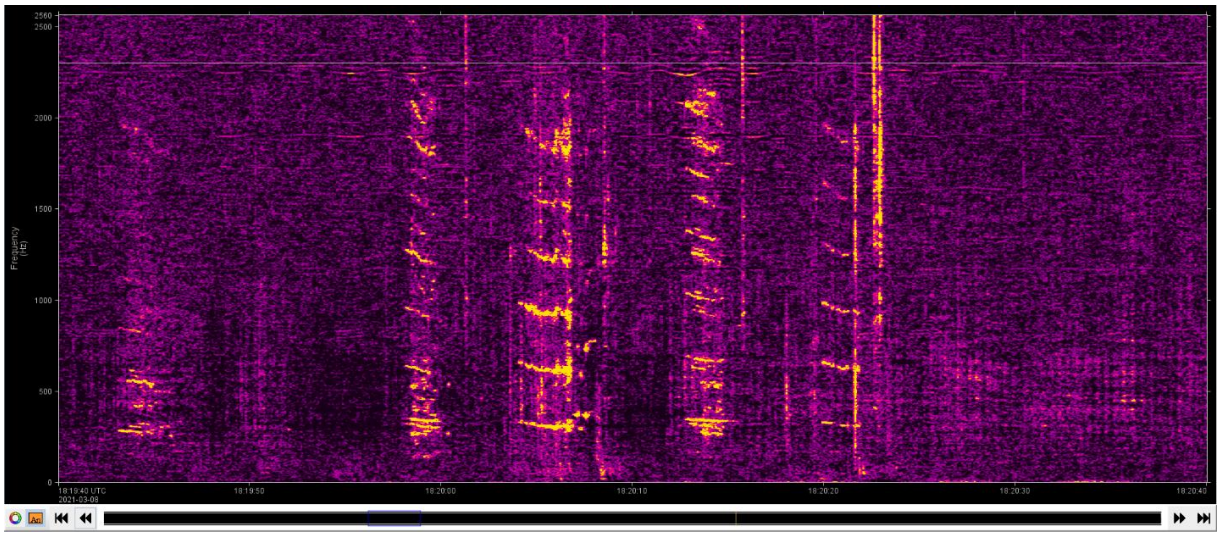


Figure 33. Transient noise from Mobile Offshore Drilling Unit (MODU) due to sea state or other movement on the anchored position (spectrogram normalised across transients).

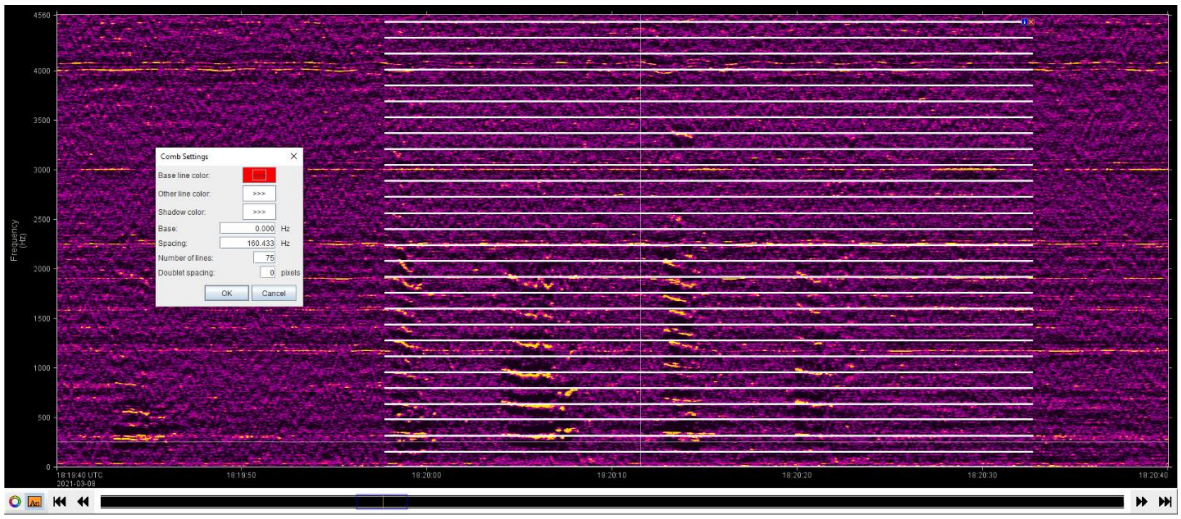


Figure 34. Generator analysis showing hotel load tonals.

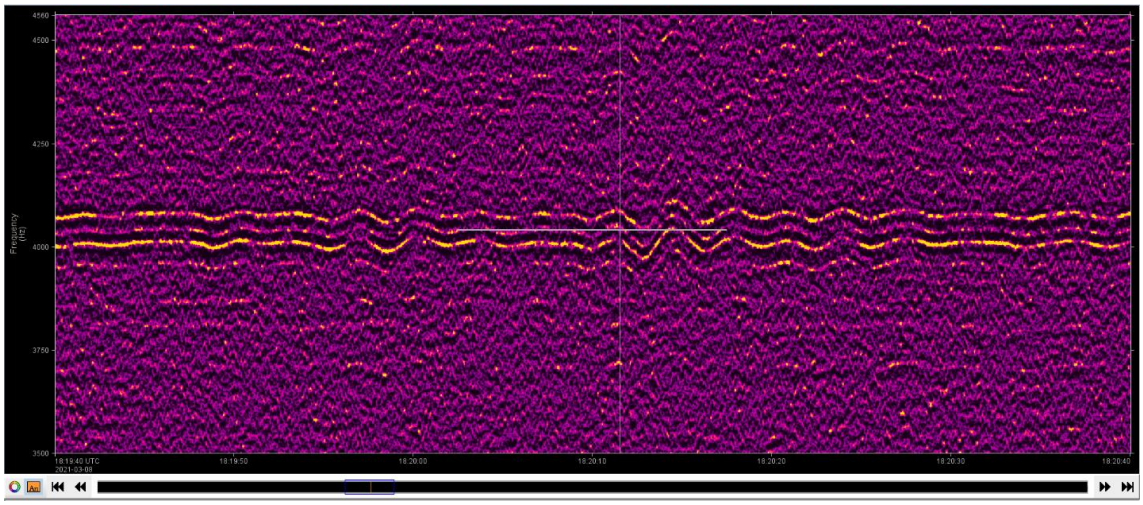


Figure 35. Three distinct gensets with accompanying cylinder firing rates throughout the spectrogram. These appear related to MODU operations as there are no secondary contacts on spectrogram and the tonals fluctuate with power draw.

5.5. Source Levels

ShipSound was used to determine the source levels for the *Ocean Onyx* and support vessels under dynamic positioning and during transits using the methods detailed in Section 4.2.3 and the operations described in Section 2.5. The following sections detail the Monopole Source Levels for each of these sources.

5.5.1. MODU

Following the method detailed in Section 4.2.3.2 and the periods specified in Table 8, the mean and maximum MSL for the *Ocean Onyx* was determined for three drilling depth ranges (Figure 36). The mean MSL is more representative of typical levels for each drilling depth and therefore suitable for comparison to the levels used in Koessler et al. (2020). Three example ShipSound reports are provided in Appendix G.1, and a spectrogram of drilling activities extracted from the ShipSound report included in Appendix G.1.2 is shown in Figure 37.

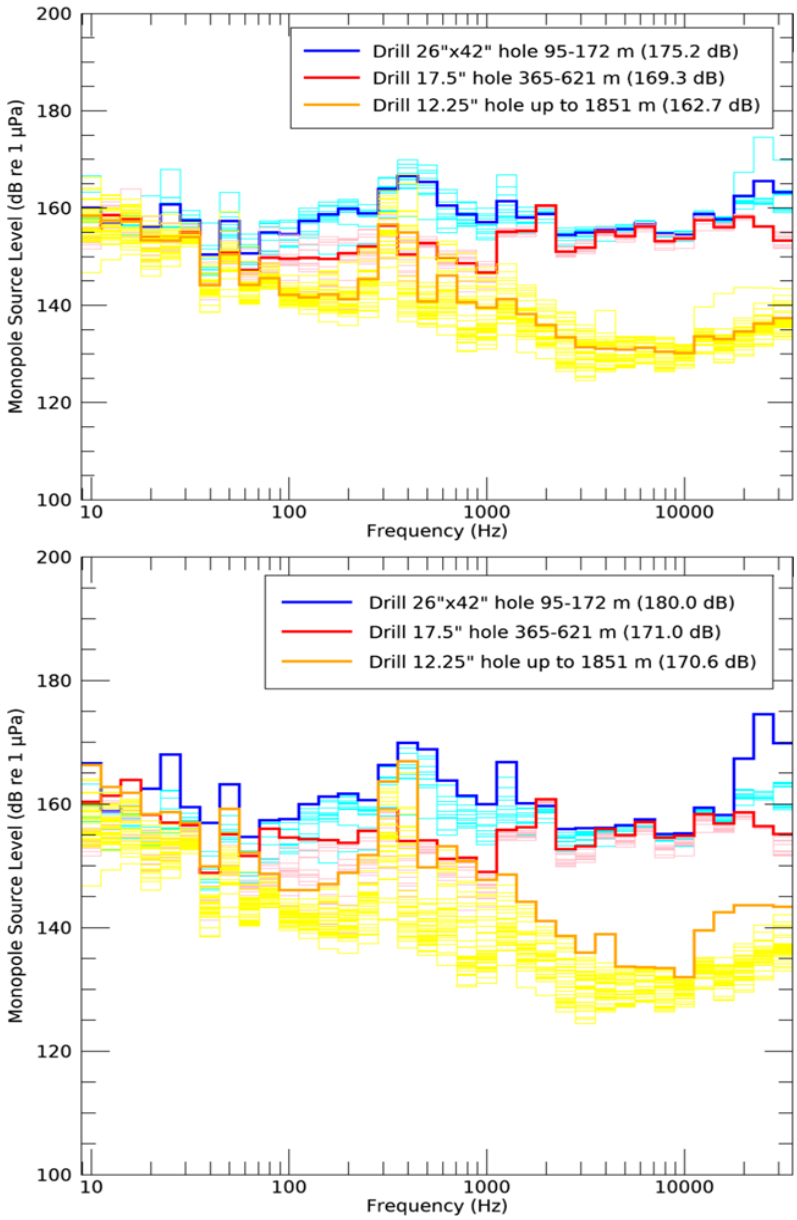


Figure 36. Monopole Source Level (MSL) and spectra for *Ocean Onyx* Mobile Offshore Drilling Unit (MODU) from Station 1 ShipSound processing, averaged over a ShipSound measurements over three different drilling depths, mean (top) and maximum (bottom).

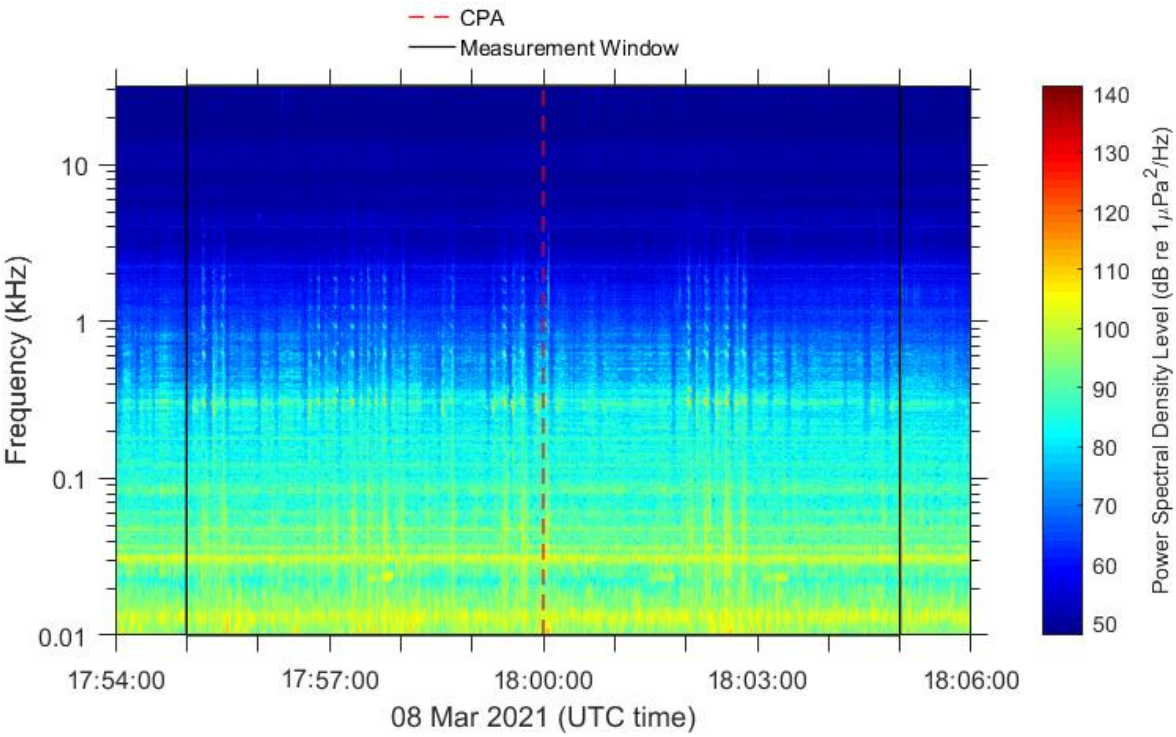


Figure 37. Spectrogram from ShipSound report included in Appendix G.1.2, with a calculated Monopole Source Level (MSL) of 159.6 dB re 1μPa m.

Table 11. *Ocean Onyx* monopole source levels (MSLs) from Figure 36.

Measurement	Monopole source level (dB re 1 μPa m)	
	Mean	Maximum
Drilling 26”x42” hole from 95–172 m	175.2	180.0
Drilling 17.5” hole from 365–621 m	169.3	171.0
Drilling 12.25” hole up to 1851 m	162.7	170.6

5.5.2. Vessels under Dynamic Positioning

Following the method detailed in Section 4.2.3 for vessels under dynamic positioning, the mean MSL was determined to be 193.9 dB re 1 µPa (Figure 38). The mean representative of typical levels from the trials of dynamic positioning is therefore suitable for comparison to the levels used in Koessler et al. (2020). One example ShipSound report is provided in Appendix G.2.

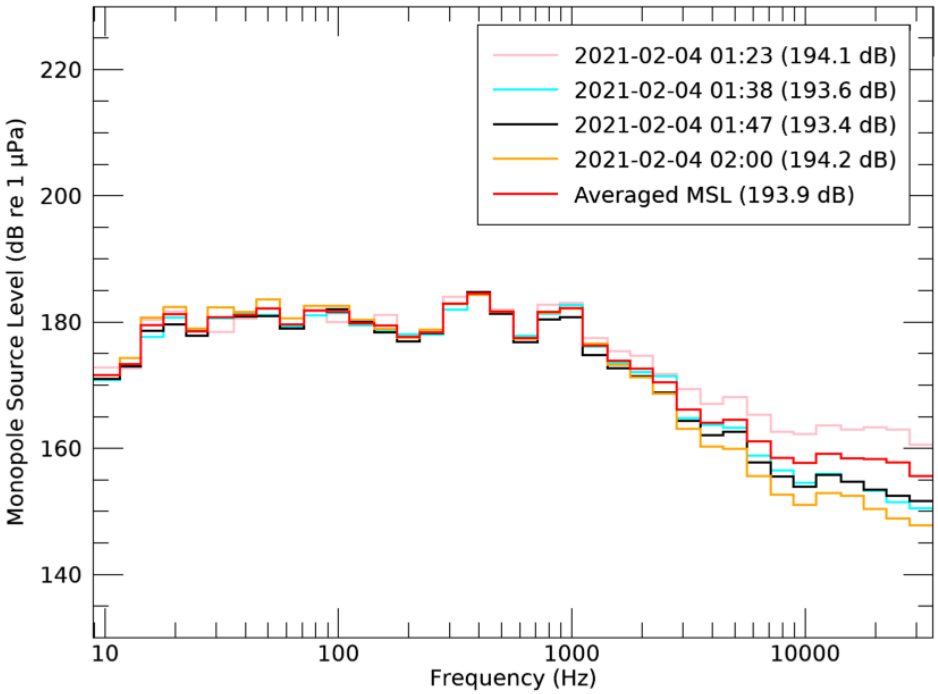


Figure 38. Monopole Source Level (MSL) and spectra for Siem *Sapphire* in dynamic positioning (DP) from Station 2 ShipSound processing. The MSL was averaged over all ShipSound measurements.

5.5.3. Vessels during Transit

Following the method detailed in Section 4.2.3 for vessels under transit, the mean MSL was determined for each vessel, the Siem *Sapphire* under transit at both 7 and 9 kn (Figures 39 and 40), and the Siem *Aquamarine* and *Topaz* at 9 kn (Figures 41 and 42). The two transit speeds are therefore suitable for comparison to the levels used in Koessler et al. (2020). One example ShipSound report is provided in Appendix G.3.

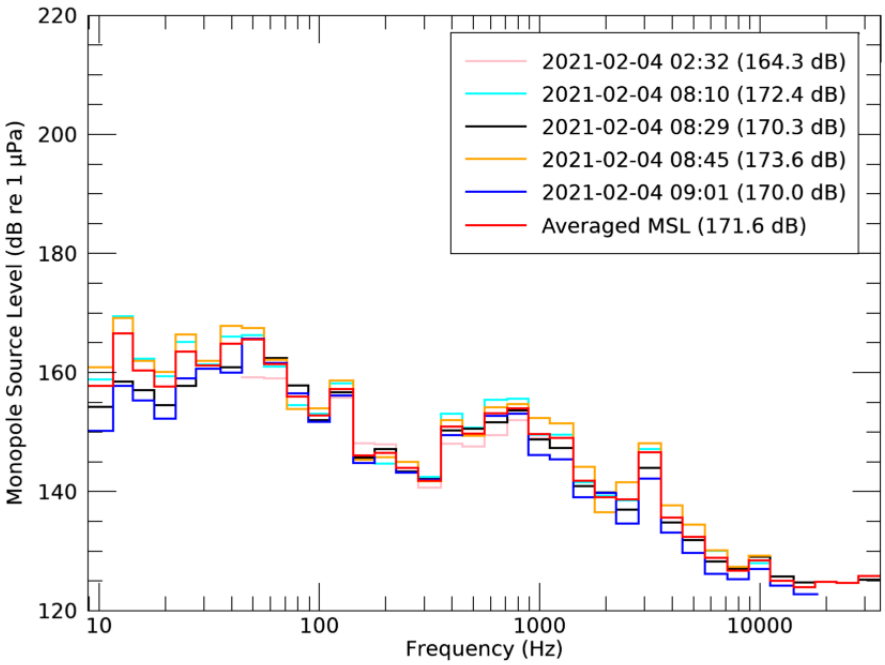


Figure 39. Monopole Source Level (MSL) and spectra for Siem *Sapphire* from Station 2 ShipSound processing. The MSL was converted to 7 kn and averaged over a few ShipSound measurements.

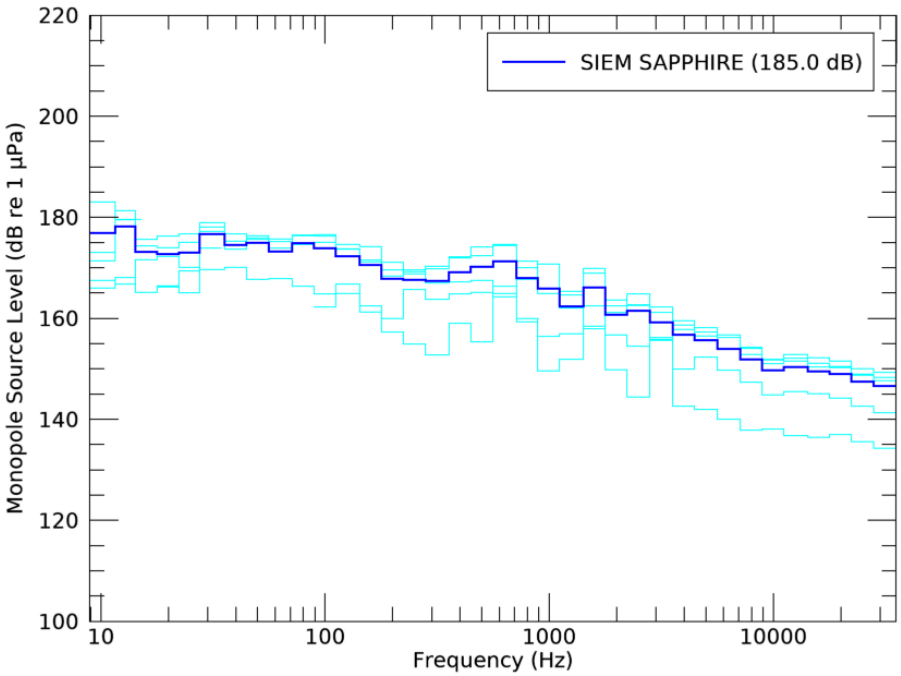


Figure 40. Monopole Source Level (MSL) and spectra for Siem *Sapphire* from Station 4 ShipSound processing. The MSL was converted to 9 kn and averaged over a few ShipSound measurements.

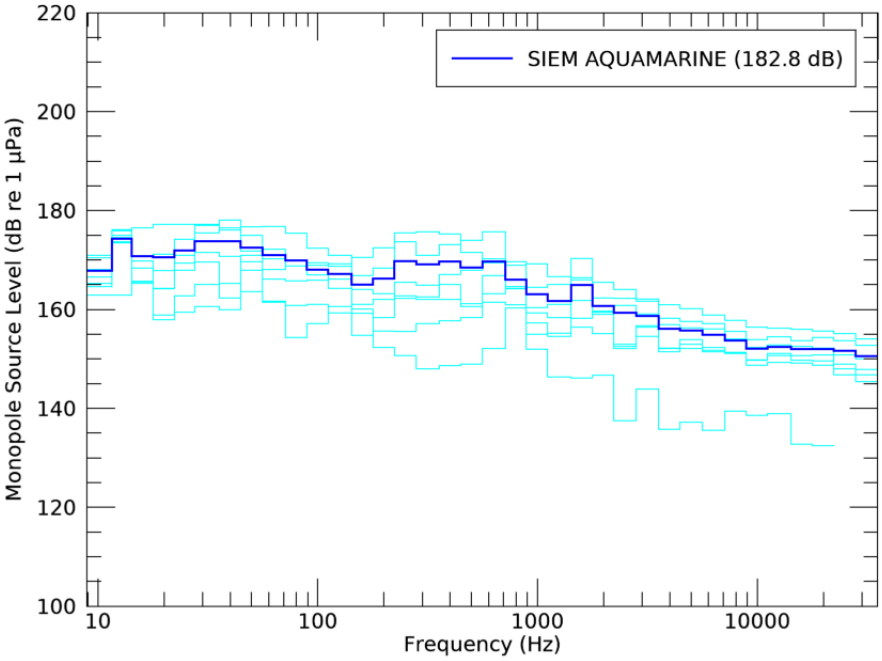


Figure 41. Monopole Source Level (MSL) and spectra for Siem *Aquamarine* from Station 4 ShipSound processing. The MSL was converted to 9 kn and averaged over a few ShipSound measurements.

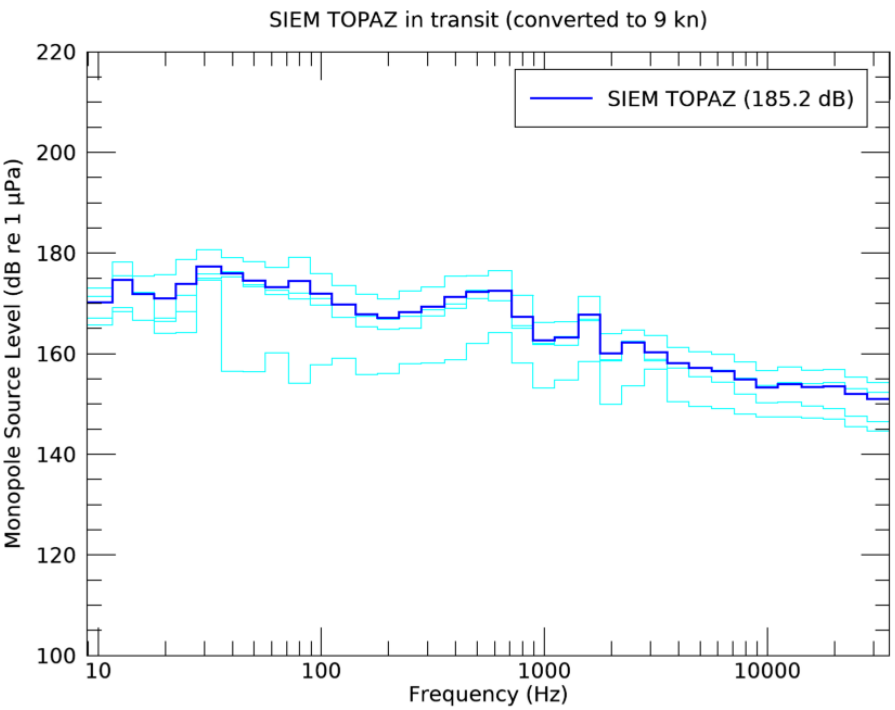


Figure 42. Monopole Source Level (MSL) for Siem *Topaz* from Station 4 ShipSound processing. The MSL was converted to 9 kn and averaged over a few ShipSound measurements.

5.6. Vessel Detections

Vessels were detected throughout the entire recording period using the automated detection algorithm described in Section 4.2.2. Results are shown for the two stations farthest from the *Ocean Onyx*, Stations 3 and 4 (Figure 43). Figure 44 shows an example of a large container vessel passing with a Lloyd's mirror pattern, and the map of the pass is shown in Figure 45, along with less defined contributions from vessel operations at the *Ocean Onyx* to the north-west (purple) between 100 and 1000 Hz. A spectrogram of a closer vessel pass and associated map are shown in Figures 46 and 47.

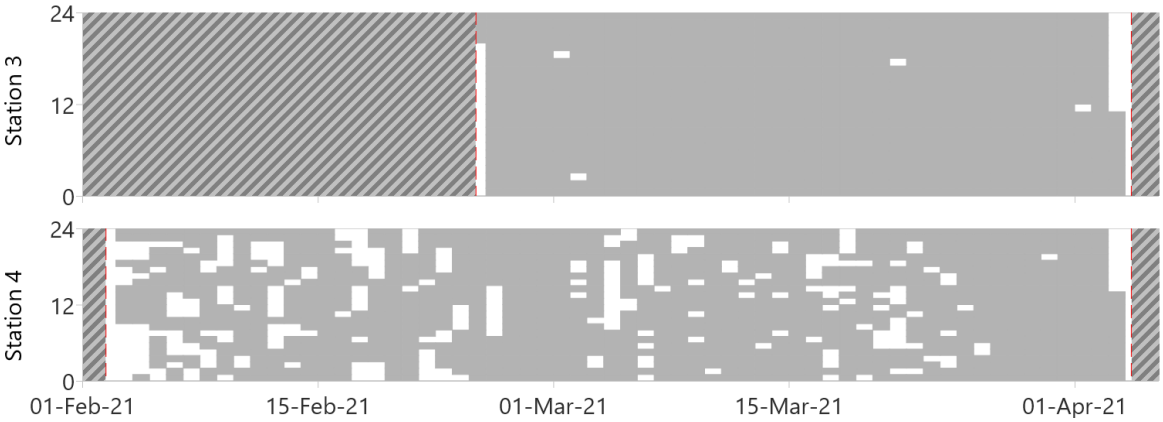


Figure 43. Vessel detections each hour (vertical axis) compared to date (horizontal axis) over the entire recording period at Stations 3 and 4. Vertical dashed lines (red) indicate AMAR deployment and retrieval dates.

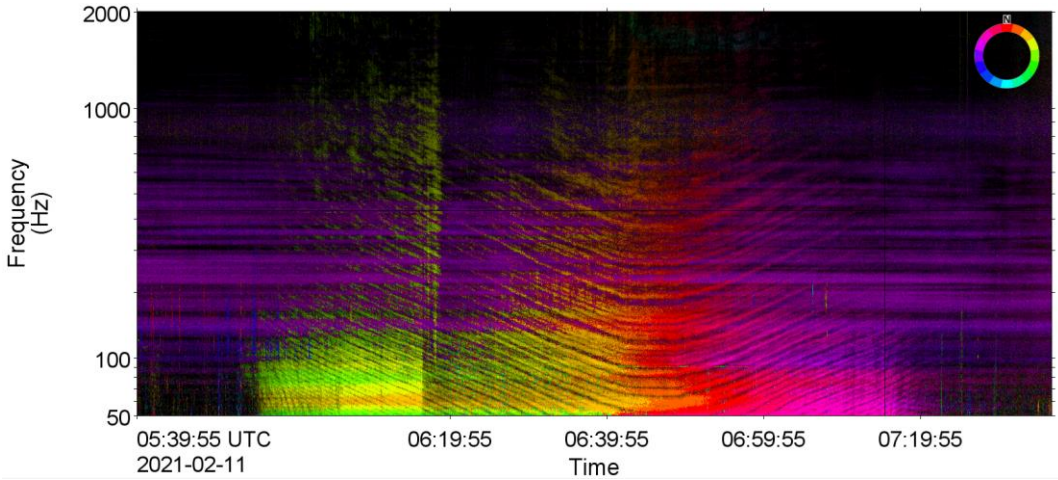


Figure 44. Example of a 334 m long container ship (*E.R. Tokyo*) travelling at 16 kn passing within 5.9 km north of Station 4 from east to west (green/yellow through to purple) that illustrates the Lloyd's mirror, or bathtub pattern over 2 h, with less defined contributions from vessel operations at the *Ocean Onyx* to the north-west (purple) between 100 and 1000 Hz. This pattern is caused by constructive and destructive interference between direct and reflected paths of sound (0.4 Hz frequency resolution, 2 s time window, 0.5 s time step, Hamming window, normalised across time).

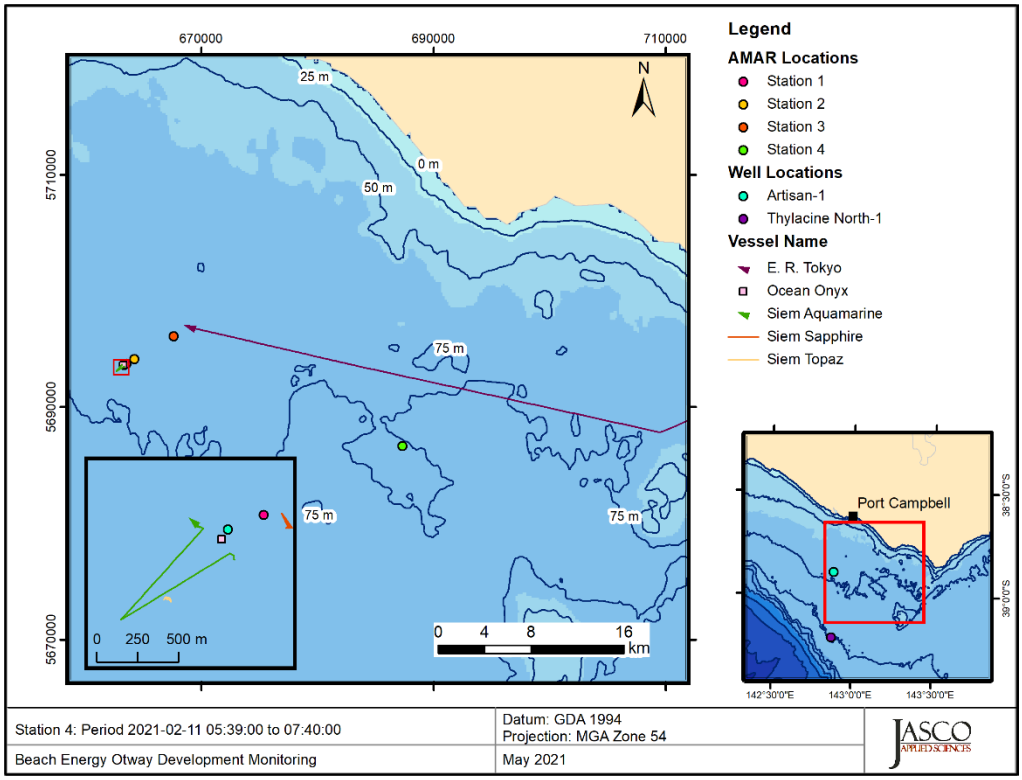


Figure 45. Map of automatic identification system (AIS) reported vessel locations for the spectrogram shown in Figure 44.

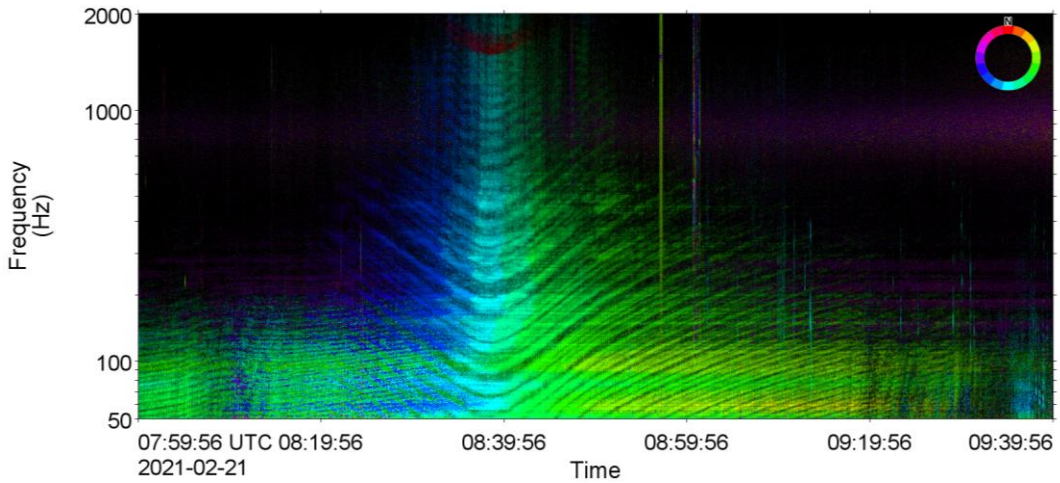


Figure 46. Example of a 200 m long vehicle carrier (*Tombarra*) travelling at 13 kn passing within 2.6 km south of Station 4 from east to west (green/yellow through to purple) that illustrates the Lloyd's mirror, or bathtub pattern over 2 h, with less defined contributions from vessel operations at the *Ocean Onyx* to the north-west (purple) between 100 and 1000 Hz. This pattern is caused by constructive and destructive interference between direct and reflected paths of sound (0.4 Hz frequency resolution, 2 s time window, 0.5 s time step, Hamming window, normalised across time).

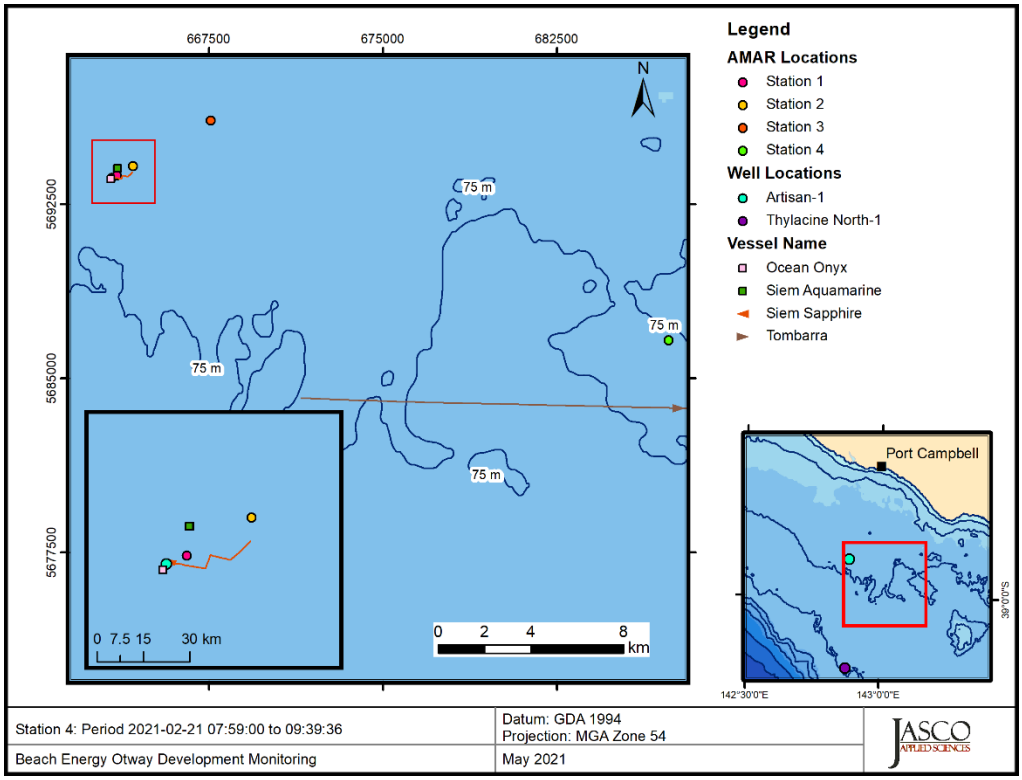


Figure 47. Map of automatic identification system (AIS) reported vessel locations for the spectrogram shown in Figure 46.

5.7. Marine Mammals

The acoustic presence of marine mammals was identified automatically by JASCO's detectors (Section 4.2.7.3) and validated via the manual review of 0.5% of the data, which represents 312 of the 5 min sound files, or 26 h worth of data. Acoustic signals of pygmy blue whales and dolphins were identified and vocalisations of other mysticetes, such as humpback and southern right whales, were not detected by the detectors (D.2), or observed during the 0.5% manual review.

5.7.1. Dolphins

Dolphins produce both impulsive (click) and tonal (whistle) sounds that show less species-level specificity than other marine mammal signals and are therefore more difficult to distinguish acoustically. Due to the directionality of impulsive clicks and the associated degradation of their spectral features when recorded at increasing angles away from the longitudinal axis of the vocalising animal, delphinid clicks cannot be confidently assigned to individual species. Furthermore, because the audible frequency of the acoustic data only reached 32 kHz, much of the energy from dolphin clicks (which can reach over 150 kHz) was not captured. Because of the overlap in spectral features of tonal signals from different dolphin species (Steiner 1981) and the expected but unquantified variability of these signals around the few described vocalisation types, we were unable to distinguish dolphin whistles by species.

The dolphin clicks and whistles observed in the data (Figure 48) were likely produced by short-beaked common dolphins (*Delphinus delphis*), and/or bottlenose dolphins (*Tursiops sp.*) (Bilgmann et al. 2007, Bilgmann et al. 2014, Charlton-Robb et al. 2015). These signals were observed at all stations throughout the recording period with detections highest at Station 4 and through the month of March

at Stations 1, 2, and 3 (Figures 49 and 50). It was apparent that dolphin clicks occurred more at night than during the day, particularly at Stations 1–3 (Figure 49).

A third vocalisation type believed to be produced by dolphin calves was also observed in March at Station 3 alongside whistles (Figure 51). These lower frequency patterns of ‘chirps’ and ‘quacks’ have previously been attributed by JASCO analysts to young bottlenose dolphins.

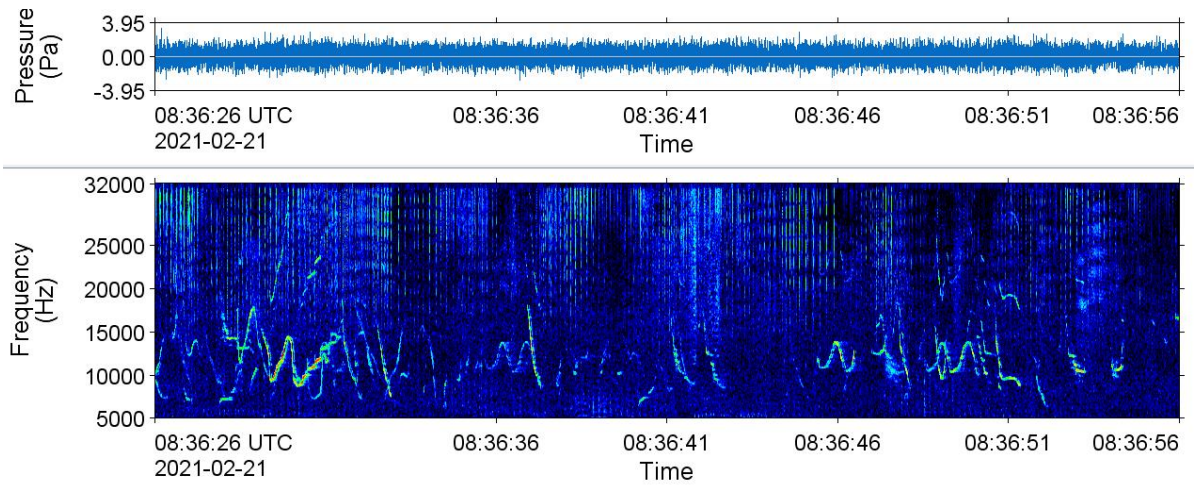


Figure 48. Spectrogram of dolphin clicks and whistles recorded on 21 Feb 2021 at Station 4 (64 Hz frequency resolution, 0.01 s time window, 0.005 s time step, Hamming window, normalised across time). The window length is 30 s.

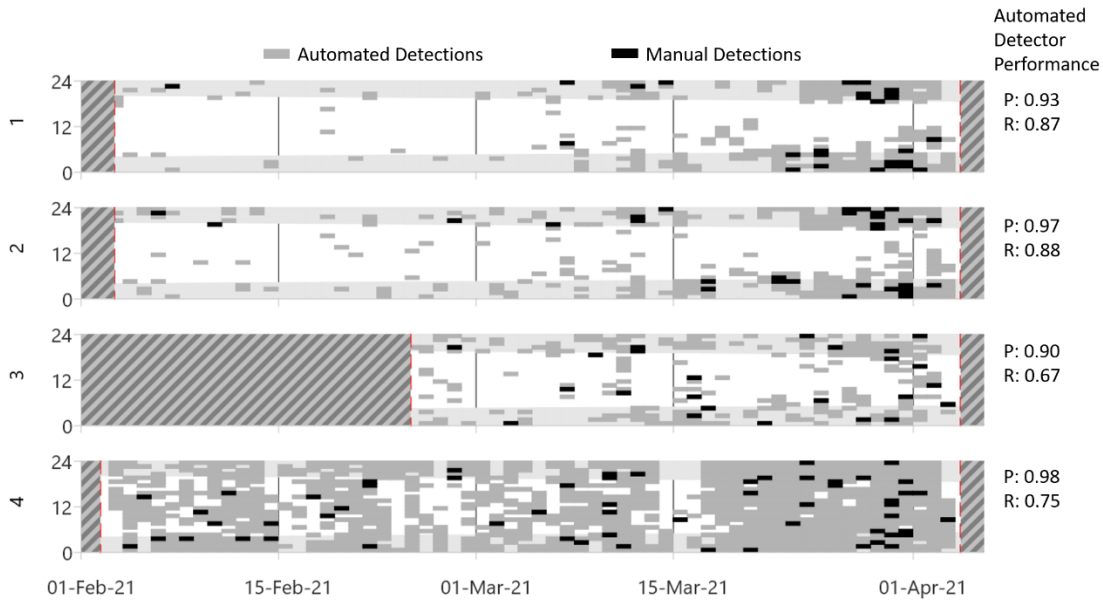


Figure 49. Daily and hourly occurrence of dolphin click detections recorded at Stations 1–4 (top – bottom) with automated detector performance metrics included along right side. The grey areas indicate hours of darkness from sunset to sunrise (Ocean Time Series Group 2009). Hashed areas indicate when there was no acoustic data and red dashed lines indicate the start and end of recordings. Automated detector results are for the dolphin click train detector.

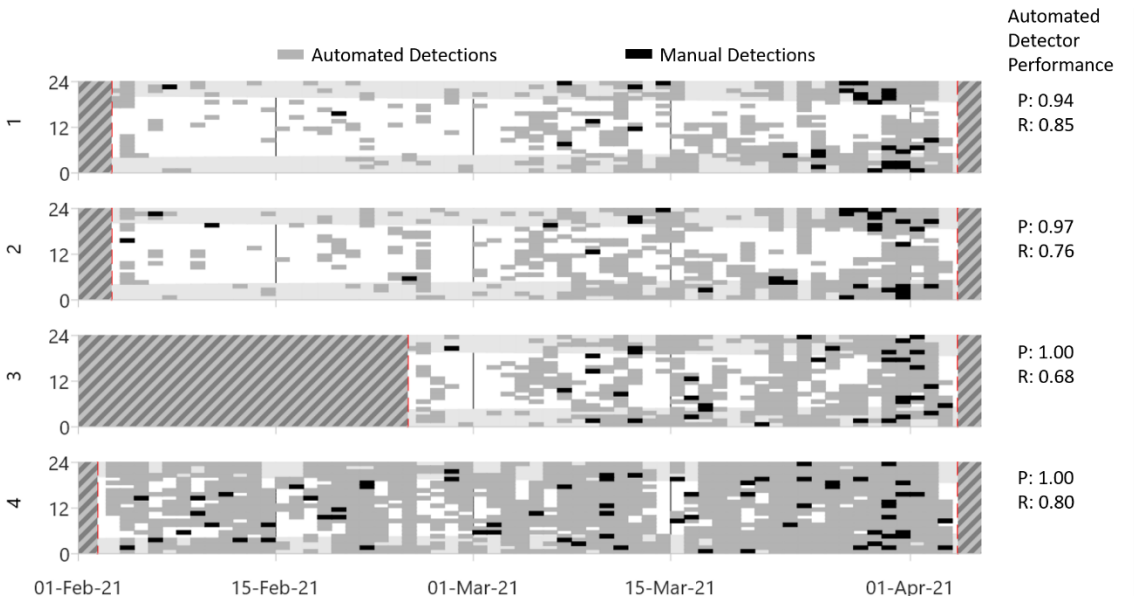


Figure 50. Daily and hourly occurrence of dolphin whistle detections recorded at Stations 1–4 (top – bottom) with automated detector performance metrics included along right side. The grey areas indicate hours of darkness from sunset to sunrise (Ocean Time Series Group 2009). Hashed areas indicate when there was no acoustic data and red dashed lines indicate the start and end of recordings. Automated detector results are for the WhistleHigh detector.

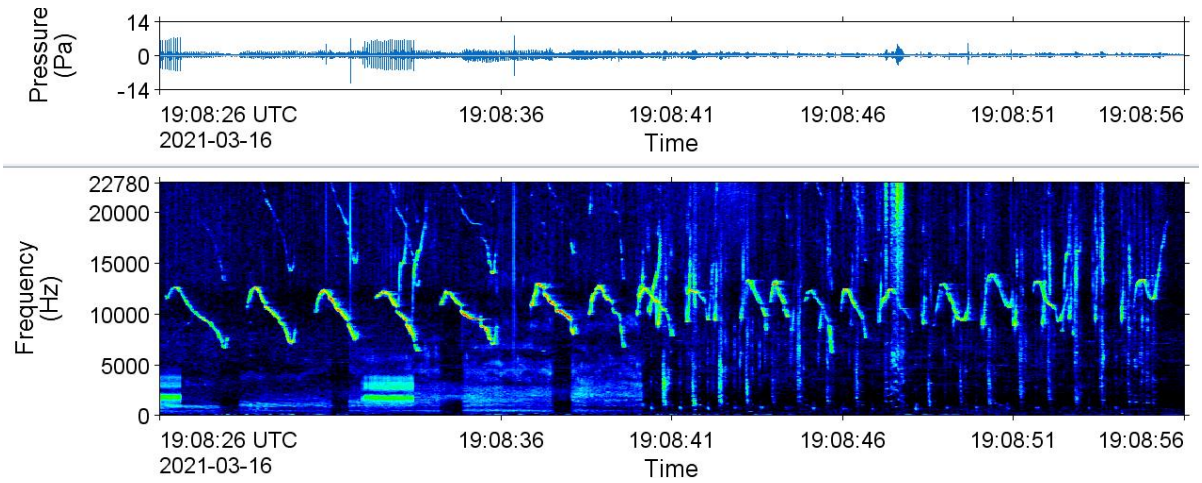


Figure 51. Spectrogram of dolphin whistles (above 5000 Hz) and sounds from young dolphins (majority present under 5000 Hz) recorded on 16 Mar 2021 at Station 3 (2 Hz frequency resolution, 0.125 s time window, 0.03125 s time step, Hamming window, normalised across time). The window length is 30 s.

5.7.2. Pygmy Blue Whales

Songs of pygmy blue whales (*Balaenoptera musculus brevicauda*; Figures 52 and 53) were detected sporadically through February and the first half of March. By the end of March, the signals were present in almost every hour of recording (Figure 54). This pattern of occurrence was reflected across all recording stations (Figure 54). In addition to the songs containing A, B, and C notes (Figures 52 and 53) (McDonald et al. 2006, Gavrilov and McCauley 2013, McCauley et al. 2018) that were the most common blue whale vocalisation in the data, blue whale D calls (Figure 55) (Recalde-Salas et al. 2014) were also present at the end of March and into April.

At Station 4, the direction of the blue whale acoustic signals relative to the recorder position was observed. An example of this is provided in Figure 52, where one blue whale is singing to the northwest, and one is singing to the southeast. Similarly, in Figure 55, the blue whale is calling from south of the recorder. When manually analysing blue whales at Station 4, an annotation was created for every direction of calling animals and the direction saved with the annotation. Figure 56 summarises these blue whale directional results from manual analysis. Blue whales occurred in all directions relative to Station 4, and there were 1–3 individuals confirmed vocalising at a time (Figure 56). Early in the recording, there is an apparent trend in the animals being more to the east and, later in the recording, being more to the west. However, the data were too sparse to confirm anything about animal movements.

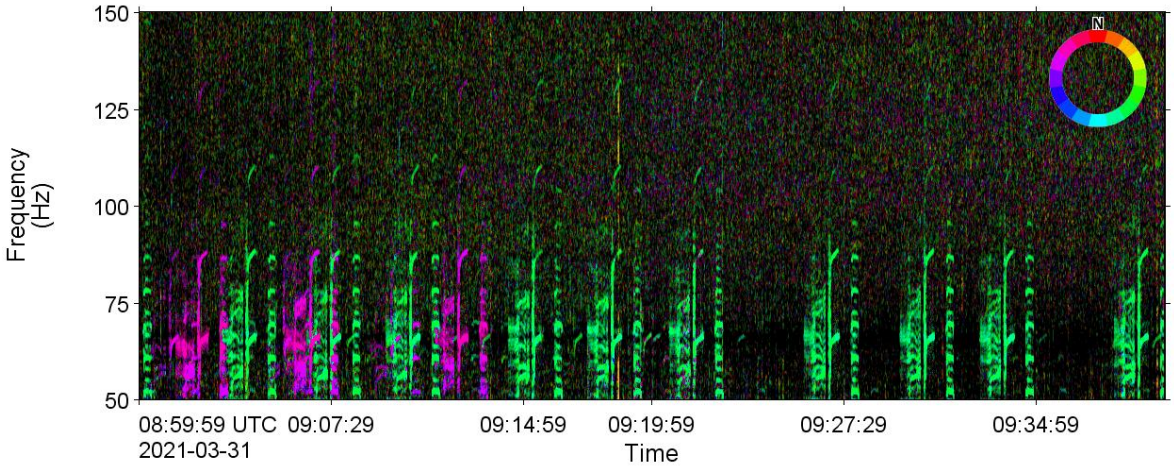


Figure 52. Directogram of pygmy blue whale songs recorded on 31 Mar 2021 at Station 4 (UTC) (0.4 Hz frequency resolution, 2 s time window, 0.5 s time step, Hamming window, normalised across time). Displaying ~40 min of data. One blue whale is singing to the northwest of Station 4 (pink) and one is singing to the southeast of Station 4 (green).

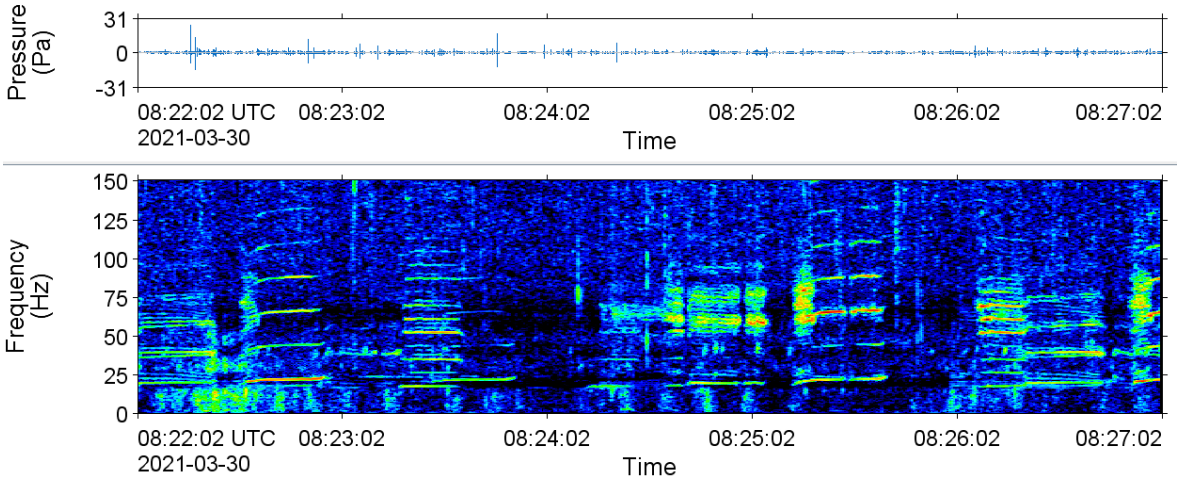


Figure 53. Spectrogram of pygmy blue whale songs recorded on 30 Mar 2021 at Station 3 (UTC) (0.4 Hz frequency resolution, 2 s time window, 0.5 s time step, Hamming window, normalised across time). Displaying 5 min of data.

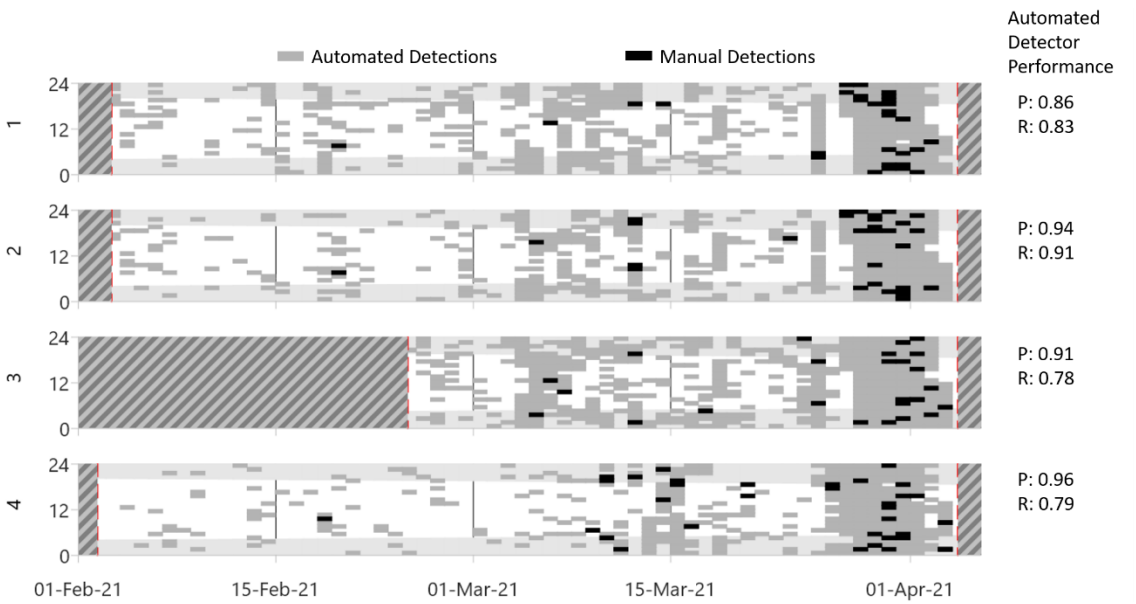


Figure 54. Daily and hourly occurrence of pygmy blue whale vocalisations recorded at Stations 1–4 (top – bottom) with automated detector performance metrics included along right side. The grey areas indicate hours of darkness from sunset to sunrise (Ocean Time Series Group 2009). Hashed areas indicate when there was no acoustic data and red dashed lines indicate the start and end of recordings. Automated detector results are for the AUS_BW_BH20 detector.

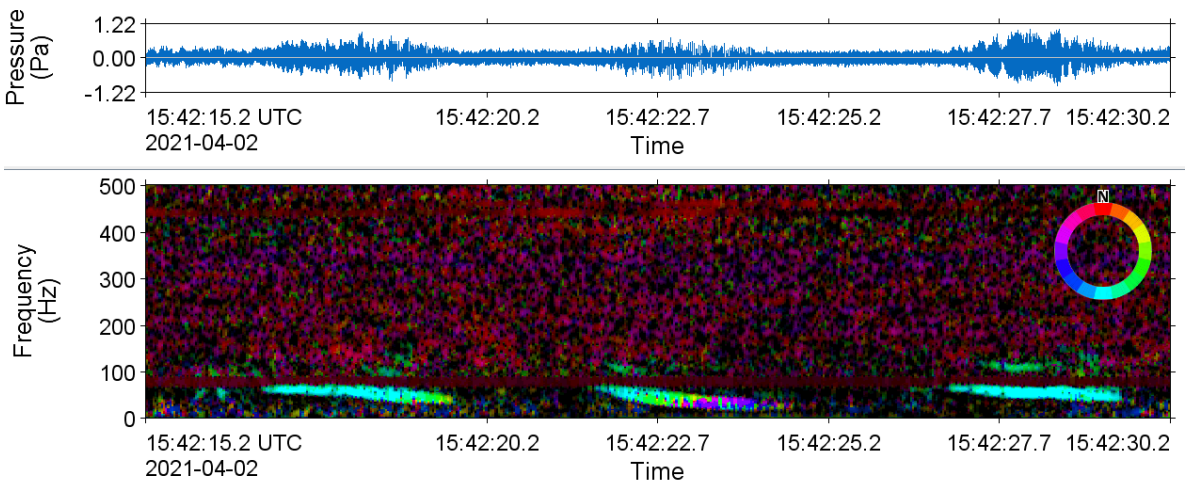


Figure 55. Directogram of pygmy blue D calls recorded on 2 Apr 2021 at Station 4 (UTC) (2 Hz frequency resolution, 0.125 s time window, 0.03125 s time step, Hamming window, normalised across time). Displaying 16 s of data. The blue whale is vocalising to the south of Station 4 (teal). In the second call, the frequencies fall below those which can be accurately determined with the hydrophone spacing using, with the colour of the signal changing from teal to purple and navy blue.

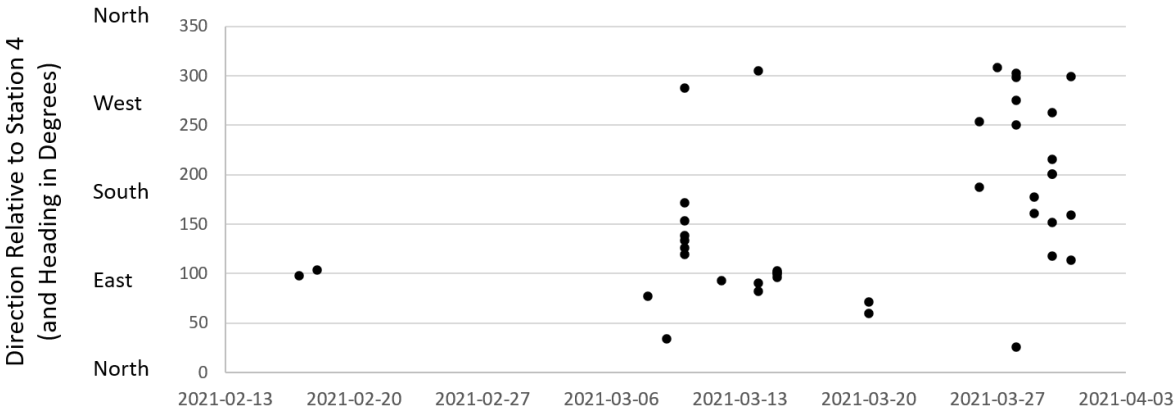


Figure 56. Plot of direction of blue whale vocalisations relative to Station 4 over the recording period where each point is a calculated from a manual annotation created during the 0.5% manual validation analysis (one annotation per direction per 5 min file analysed).

5.7.3. Other Potential Biological Sounds

Occasionally during manual analysis, pulses ranging from ~750 to 1250 Hz (Figure 57) were observed that may have been produced by fish. Alternatively, these signals could be a result of some anthropogenic activity, noises from which were noted through much of the data during manual review, particularly at Stations 1 and 2. Fish chorusing activity was apparent in the LTSAs, in particular at Station 4, with examples provided in Figures 58–60.

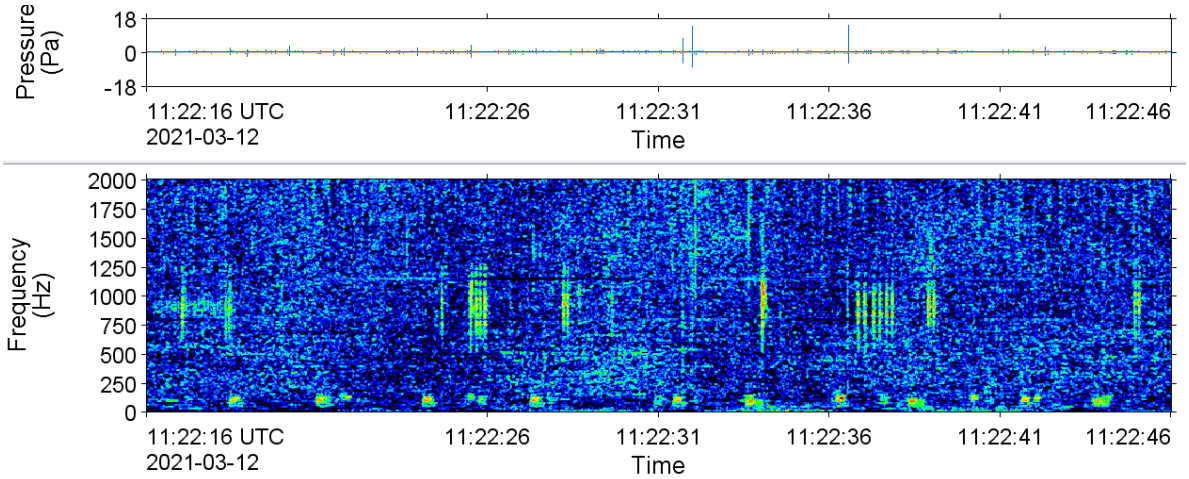


Figure 57. Spectrogram of unknown signals potentially produced by fish (pulses at 500–1250 Hz) recorded on 12 Mar 2021 at Station 3 (UTC) (2 Hz frequency resolution, 0.125 s time window, 0.03125 s time step, Hamming window, normalised across time). Displaying 30 s of data.

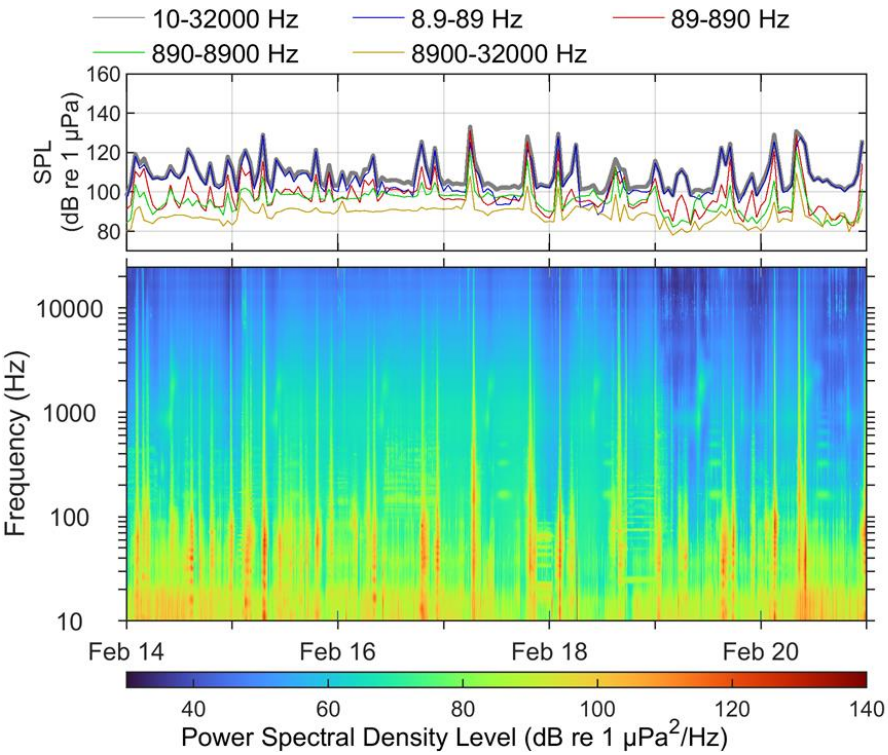


Figure 58. In-band sound pressure level (SPL) and spectrogram (or long-term spectral average; LTSA) of underwater sound for one week of data at Station 4, showing daily fish chorus's between 700 and 2000 kHz, and between 150 and 450 Hz, more obvious after 17 Feb 2021.

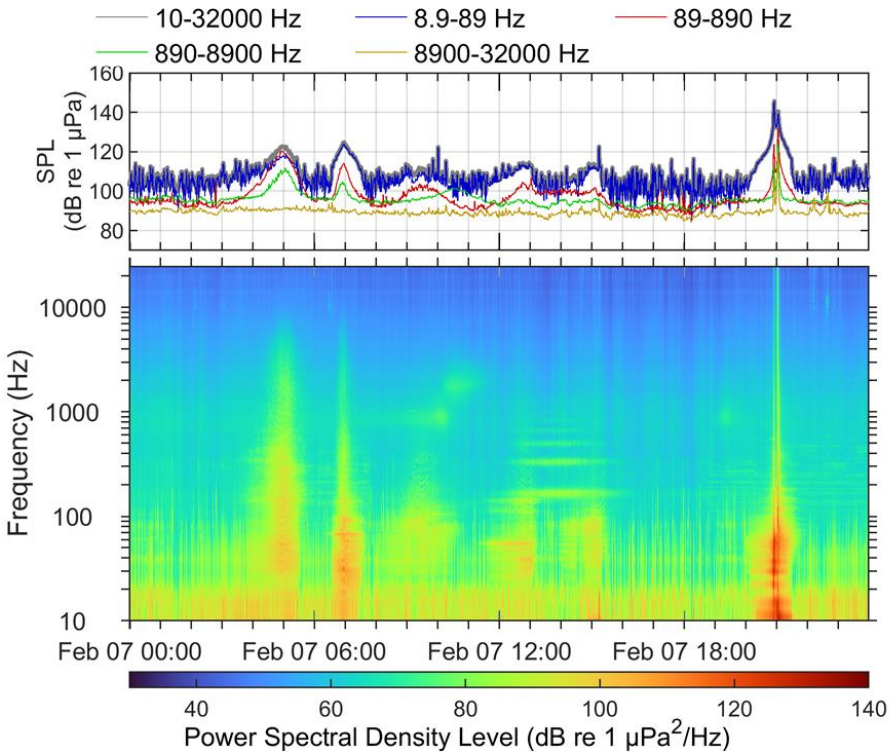


Figure 59. In-band sound pressure level (SPL) and spectrogram (or long-term spectral average; LTSA) of underwater sound for one day of data at Station 4, showing the daily fish chorus between 700 and 2000 kHz, and between 150 and 450 Hz, apparent in Figure 58, and six vessel transits.

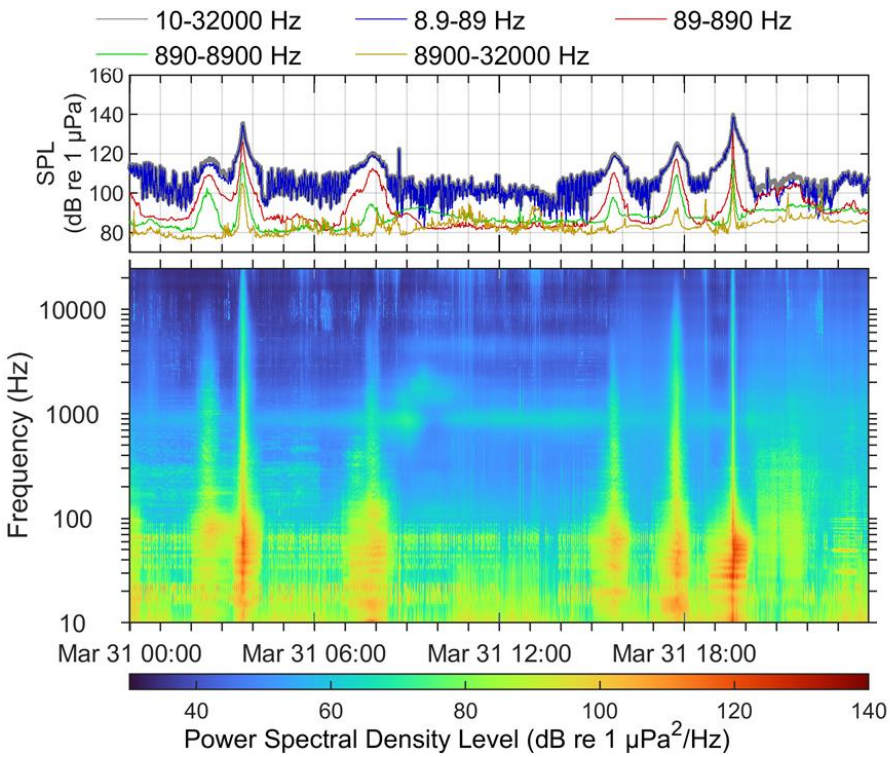


Figure 60. In-band sound pressure level (SPL) and spectrogram (or long-term spectral average; LTSA) of underwater sound for one day of data at Station 4, showing the daily fish chorus between 700 and 2000 kHz, lasting almost the entire day, along with six vessel transits.

6. Validation Analysis

Table 12 presents the four scenarios that need to be considered to validate the pre-measurement modelling presented in Koessler et al. (2020) for the Artisan-1. The scenarios are described in Table 12, with the modelling site locations and descriptions provided in Table 13.

Table 12. Description of modelling scenarios for the Artisan-1 development area from Koessler et al. (2020)

Well	Scenario number	Description	Associated modelled sites
Artisan-1	5	MODU, normal drilling operations	4
	6	OSV standby, independent of MODU, for 24 h	6
	7	MODU with OSV during resupply operations (including 4 hours alongside the MODU)	4, 5 and 6
	8	MODU with OSV standby (combination of Scenarios 5 and 6)	4 and 6

Table 13. Location details for the validation modelled sites.

Well	Site	Source	Latitude (S)	Longitude (E)	MGA Zone 54 (GDA94)		Water depth (m)
					X (m)	*Y* (m)	
Artisan-1	4	MODU	38° 53' 27.4106"	142° 52' 58.4450"	663300	5693640	71.5
	5	OSV	38° 53' 27.4021"	142° 53' 01.0962"	663364	5693639	71.6
	6	OSV standby	38° 53' 26.1553"	142° 54'21.4165"	665300	5693637	70.2

6.1. Source Level Comparison

The modelled source levels used in Koessler et al. (2020) are shown in Figures 61–63 alongside MSLs from the measurement program.

The mean estimated source levels for the vessels under transit used in the modelling study, which were derived based on the scaling of the power level, were similar to the MSL determined through the measurement study, which varied significantly with vessel speed (between 171.6 and 185.2 dB re µPa m). The trend of decreased MSL with speed follow those from studies on commercial shipping and ferries (MacGillivray et al. 2019). The measured MSL under dynamic positioning was different to that used in Koessler et al. (2020), in part due to the vessel power levels applied, but also because the approach used to estimate sound levels under dynamic positioning is based upon vessels under transit and is an approximation based on the Maximum Continuous Rating (MCR). Limited measurements of vessels under dynamic positioning using standardised measurement approaches are reported in literature, and there are significant differences between the thruster models and specifications, depths, and vessel dynamic positioning systems which control thruster operations. Therefore, this characterisation is a valuable contribution to understanding the MSLs for systems installed in anchor handling vessels.

The mean MSLs for the *Ocean Onyx* Figure 63 decrease as the drilling depth increases. The estimate of the *Ocean Onyx* source level spectrum was based on the Transocean *Polar Pioneer*, a similarly sized MODU. The *Polar Pioneer* was measured by JASCO while anchored and drilling, and had a broadband (10 Hz to 35 kHz) source level of 170.1 dB re 1 µPa m (Austin et al. 2018), although the

source level used in the modelling was 178.7 dB re 1 µPa m. The mean maximum MSL from the measurement program was 175.2 re 1 µPa m, associated with shallowest drilling depths.

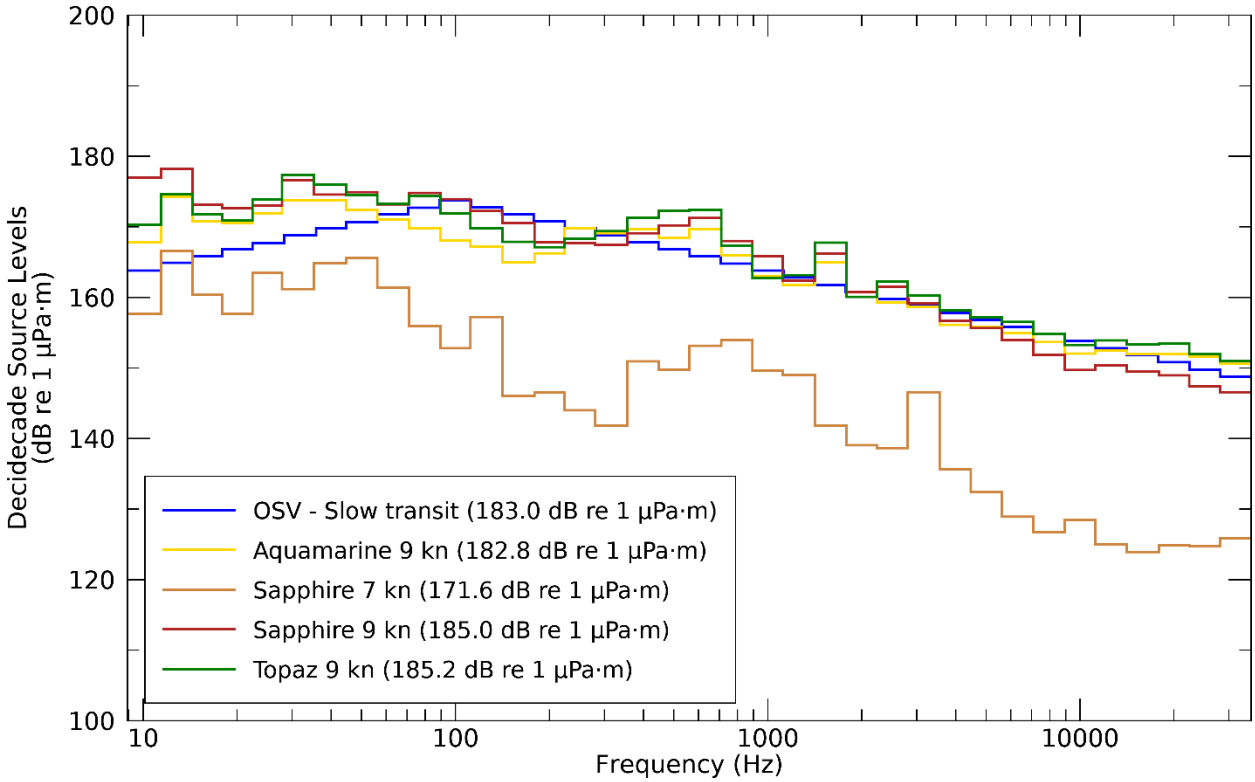


Figure 61. *Offshore Support Vessel (OSV)*: Decidecade source level spectra of the modelled OSV, slow transit (15% MCR) and Monopole source levels (MSLs) determined through the measurement program.

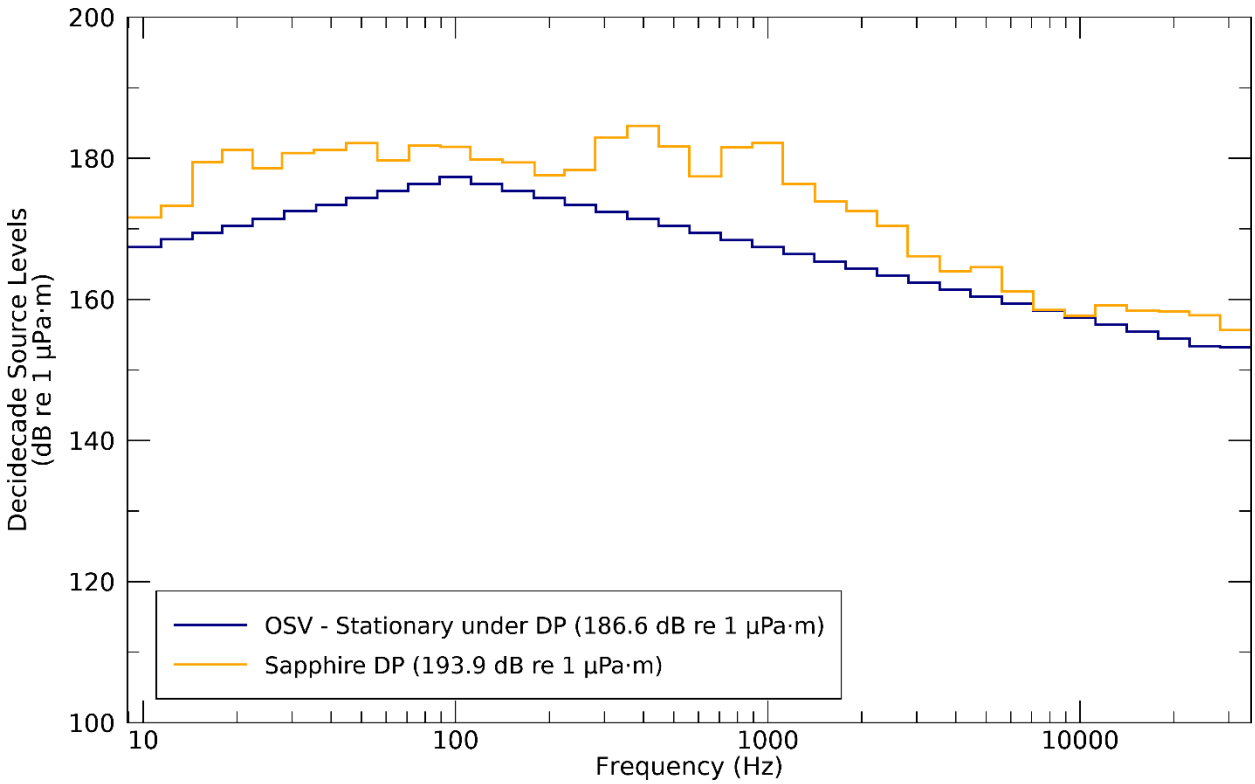


Figure 62. *Offshore Support Vessel (OSV)*: Decidecade source level spectra of the modelled DP (20% MCR) and MSLs determined through the measurement program.

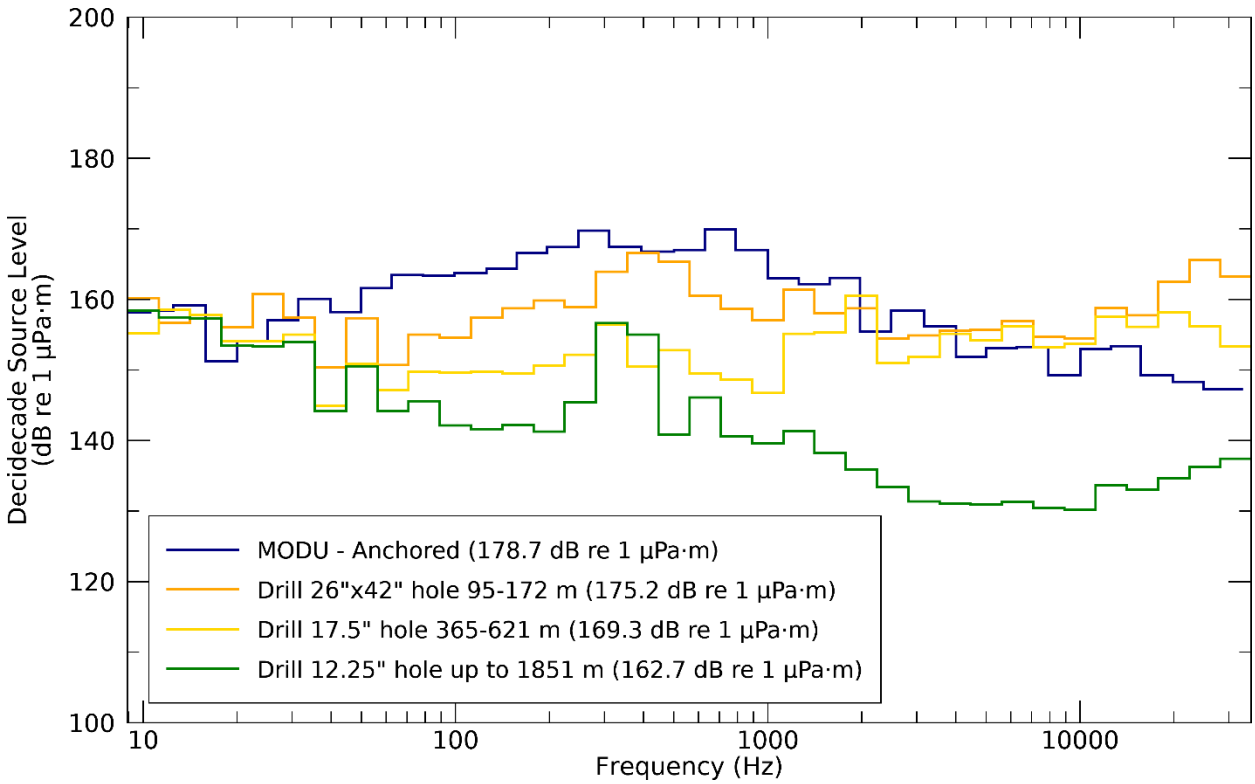


Figure 63. *Mobile Offshore Drilling Unit (MODU)*: Decidecade source level spectra of the modelled MODU, and the mean MSLs determined through the measurement program of the *Ocean Onyx* for three stages of drilling.

6.2. Understanding Propagation Loss

The plotted data and curve fits, as discussed in Section 4.2.4 and presented in Section 5.3, provide substantial detail on the environmental effects on the propagation of acoustic energy in the water column. In comparing SPL data fits for Stations 1–3, the loss rate is higher than what would have been expected in this environment, considering the higher MSLs for the support vessel on DP derived from measurements. In consideration of the potential variations in the seabed geologic compositions as indicated in Section 2.4, any difference may be attributed to the existence or absence of a thin veneer of sand.

A comparison exercise was conducted using JASCO's Marine Operations Noise Model (MONM) and JASCO's wavenumber integration model (VSTACK; Hannay et al. 2010, Jensen et al. 2011). VSTACK computes propagation loss versus depth and range for arbitrarily layered, range-independent acoustic environments using the wavenumber integration approach to solve the exact (range-independent) acoustic wave equation. Seabed reflectivity in the model is dependent on the seabed layer properties: compressional and shear wave speeds, attenuation coefficients, and layer densities. It is valid over the full angular range of the wave equation and can fully account for the elasto-acoustic properties of the sub-bottom.

A simple range-independent isovelocity water column (1500 m/s) was modelled considering a calcarenite seabed with and without a thin layer of sand as detailed in the Appendix of Koessler et al. (2020). The decidecade spectra of the measured MODU in Section 6.1 were combined with the modelled propagation loss from MONM and VSTACK to produce received level (SPL; L_p) scatter plots with range. Receivers were chosen to span the water column and the MSL source depth was located at 11 m. The results are shown below in Figures 64 and 65 when considering the mean maximum decidecade MSL presented above in Section 6.1 .

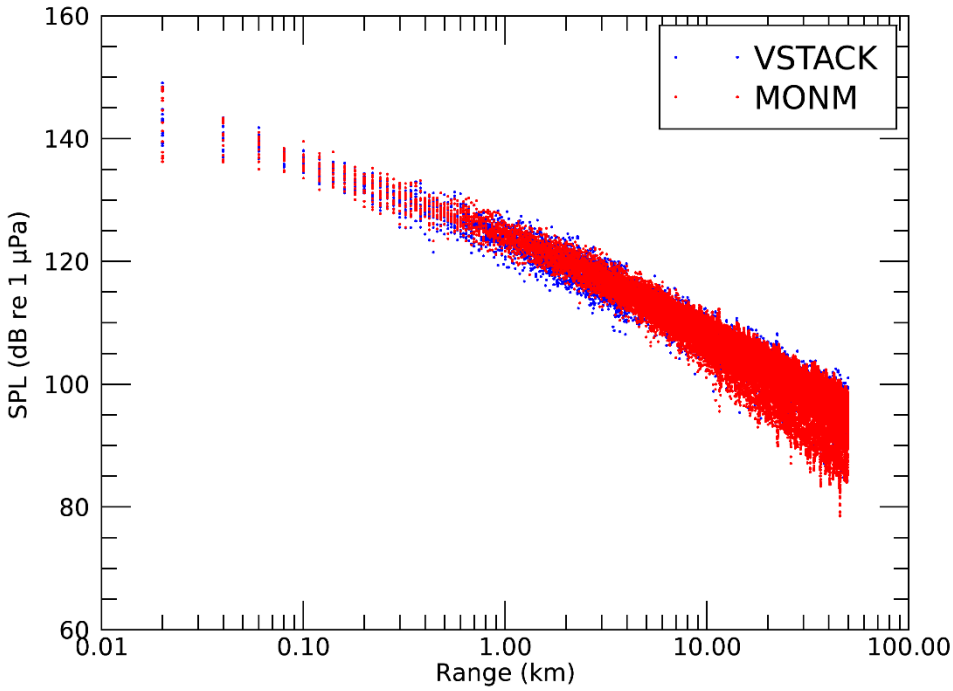


Figure 64 *Mobile Offshore Drilling Unit (MODU)*: Predicted received levels (SPL) for a simplified range independent environment with a calcarenite seabed with a thin overlying veneer of sand.

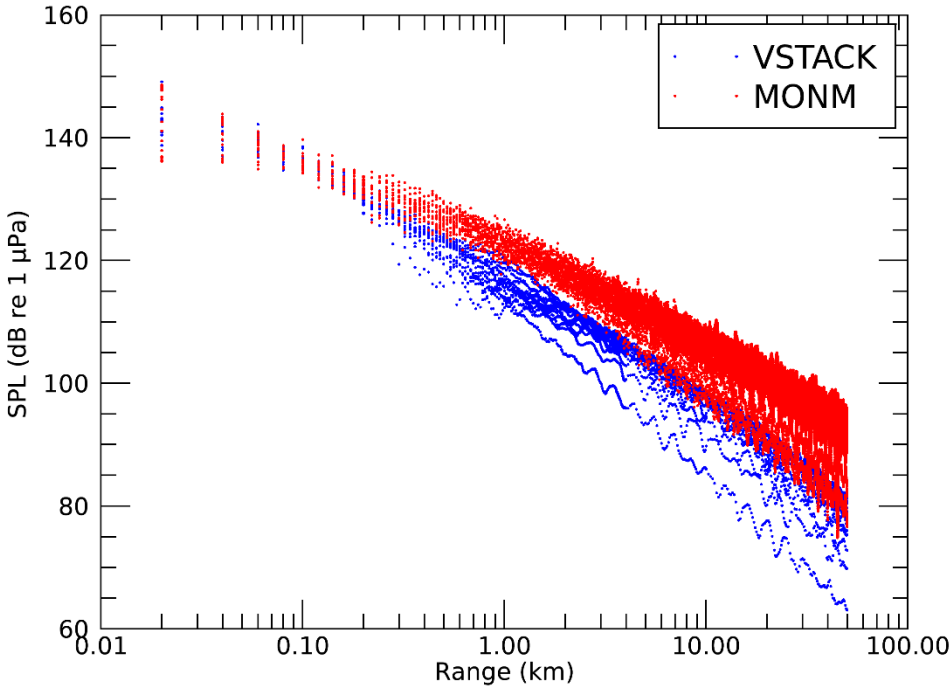


Figure 65 *Mobile Offshore Drilling Unit (MODU)*: Predicted received levels (SPL) for a simplified range independent environment with a calcarenite seabed with no sand layer.

When considering the results from VSTACK, the indication is that much higher rates of loss would be expected if no sand layer were present. Considering the variably of the distribution of seafloor sediments within the wider region, the higher rates of loss indicate that that the any overlaying sand is much thinner than or completely absent at the seafloor. In consideration of these modelled results and the SPL curve fits in in Section 5.3, the validation exercise was therefore carried out with the geoacoustic model consisting of well-cemented carbonate caprock, overlying semi-cemented carbonate rock.

An additional broadband correction was applied to the propagation loss results from MONM to account for the higher rates of loss when the full for the elasto-acoustic properties of the sub-bottom are consider. The differences between the broadband SPL from MONM and VSTACK were extracted at the same modelled ranges and depths that corresponded range independent predictions. The 90th percentile of the resultant dB differences was selected at each range to generate a generalised conversion function for each individual site to be modelled. The conversion functions were applied after the propagation loss calculation from MONM but before summing decidecade band levels, gridding, and radii calculations for each modelled site in each modelled scenario considered. Figure 66 shows an example comparison of the re-modelled results for Scenario 7 (MODU with OSV during resupply operations), at a receiver depth of 70.5 m (the median depth of measurement Stations 1–3) and an azimuth of 60°, against the data and 90th percentile data fit bounds for when the levels at Station 1 are above 150 dB re 1µPa (Figure 22). It is inferred that the data plotted here is associated with operational activity in the vicinity of the MODU and therefore may be similar to the modelled resupply operations scenario, at least for comparative purposes. The similar decay rates between the modelling and measured data indicate that re-modelled results presented here are broadly within measured range of levels for similar operations.

However, these data contain many different operations that will not exactly align with nominal representative scenarios for modelling, due to the time varying nature of the operations and associated produced sound levels. The modelled scenario produces levels that intersect the upper bound of the measured data, and therefore it is likely conservative through using the static MSL and operational representations – whilst a more detailed scenario is possible to be created (Quijano et al. 2019), that was beyond the scope of this study.

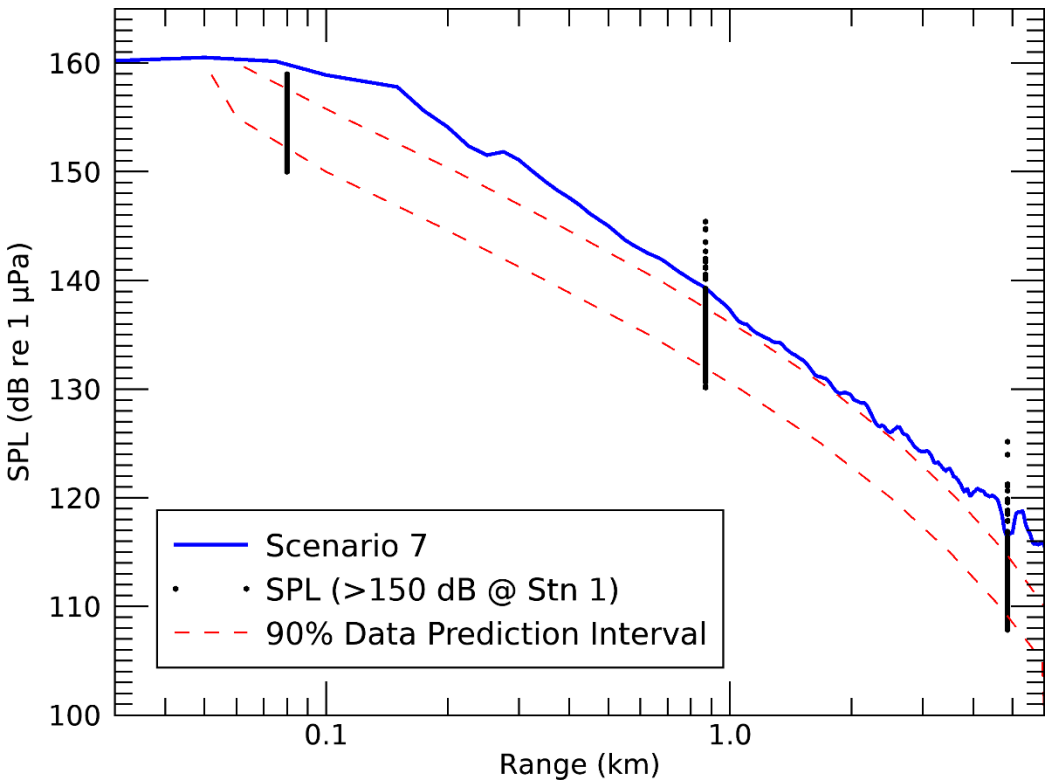


Figure 66. Generalised model validation plot.

6.3. Revised Threshold Distances

The results from the measurement study cannot be directly compared to the modelling presented in Koessler et al. (2020) due to the differences in actual events compared to the nominal representative scenarios developed and evaluated as part of the EP assessment process. Additionally, the measurements were obtained at a receiver 1.2 m off the seafloor, not at the maximum-over-depth results reported in the modelling study. The ranges obtained from the measurement study are reported in relation to the Artisan-1 well location, and thus the centre of the *Ocean Onyx*. The ranges in the modelling study are reported from a range of locations, including the centroids of multiple sources, thus it is not possible to report the measurement results in a similar fashion using the small number of recording locations used in this study.

However, the understanding of the propagation loss environment, and the revision of the representation and treatment of it as detailed in Section 6.2, enabled the modelling scenarios for activities at Artisan-1 presented in Koessler et al. (2020) to be recalculated. The revised results for distances to maximum-over-depth SPL isopleths are presented in Table 14 and compared in Table 15 to the original modelling. The revised results for distances to maximum-over-depth SEL thresholds are presented in Table 16 and compared in Table 17 to the original modelling.

Table 14. Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) to sound pressure level (SPL) from the most appropriate location for considered sources per scenario (see table footnotes).

SPL (L_p; dB re 1 µPa)	MODU (Scenario 5)		OSV standby (Scenario 6)		MODU and OSV resupply (Scenario 7)[A]		MODU and OSV standby (Scenario 8)[B]	
	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)
180	–	–	–	–	0.03	0.03	–	–
170[C]	–	–	–	–	0.06	0.06	–	–
160	–	–	–	–	0.13	0.12	–	–
158[D]	–	–	–	–	0.16	0.15	–	–
150	0.04	0.04	–	–	0.32	0.31	–	–
140	0.12	0.11	0.03	0.03	0.83	0.78	0.03	0.03
130	0.36	0.35	0.14	0.14	2.3	2.16	0.14	0.14
120[E]	1.17	1.09	0.37	0.35	7.02	6.41	2.09	1.9
110	4.74	3.87	0.91	0.88	18.03	15.85	5.21	4.54

[A] Radial distance reported from the mid-point between the MODU and the OSV on DP in resupply operations.
[B] Radial distances for isopleths/thresholds that envelope the MODU and OSV were reported from the mid-point between the MODU and the centre of the OSV standby area. Otherwise radial distances reported from the OSV in the standby area.
[C] 48 h threshold for recoverable injury for fish with a swim bladder involved in hearing (Popper et al. 2014).
[D] 12 h threshold for TTS for fish with a swim bladder involved in hearing (Popper et al. 2014).
[E] Threshold for marine mammal behavioural response to continuous noise (NOAA 2019).
A dash indicates the level was not reached within the limits of the modelling resolution (25 m).

Table 15. Difference in maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) to sound pressure level (SPL) between Koessler et al. (2020) and modelling completed using data from measurement study. Positive values indicate and increase in distance as compared to Koessler et al. (2020), negative values indicate a decrease.

SPL (L_p; dB re 1 µPa)	MODU (Scenario 5)		OSV standby (Scenario 6)		MODU and OSV resupply (Scenario 3)		MODU and OSV standby (Scenario 4)	
	Difference R_{max} (km)	Difference $R_{95\%}$ (km)	Difference R_{max} (km)	Difference $R_{95\%}$ (km)	Difference R_{max} (km)	Difference $R_{95\%}$ (km)	Difference R_{max} (km)	Difference $R_{95\%}$ (km)
180	*	*	*	*	*	*	*	*
170	*	*	*	*	0.03	0.03	*	*
160	*	*	*	*	0.07	0.06	*	*
158	*	*	*	*	0.07	0.06	*	*
150	-0.04	-0.04	-0.05	-0.05	-0.01	0.0	-0.05	-0.05
140	-0.09	-0.09	-0.34	-0.33	-0.77	-0.75	-0.34	-0.33
130	-0.83	-0.74	-1.75	-1.67	-3.59	-3.25	-3.08	-2.68
120	-4.74	-4.3	-5.86	-5.34	-10.4	-8.99	-6.85	-5.99
110	-30.13	-18.76	-18.06	-14.43	-42.03	-32.65	-31.54	-23.44

An asterisk indicates that the difference in radial distance could not be computed due to distances less than the modelled resolution .

Table 16. Maximum (R_{max}) horizontal distances (in km) to frequency-weighted SEL_{24h} PTS and TTS thresholds based on NMFS (2018) and Finneran et al. (2017) from the most appropriate location for considered sources per scenario, and ensonified area (km²).

Hearing group	SEL_{24h} threshold ($L_{E,24h}$; dB re 1 µPa²·s)[B]	MODU (Scenario 5)		OSV standby (Scenario 6)		MODU and OSV resupply (Scenario 7)[A]		MODU and OSV standby (Scenario 8)[A]	
		R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)	R_{max} (km)	Area (km²)
PTS									
LF cetaceans	199	–	–	–	–	–	–	–	–
MF cetaceans	198	–	–	–	–	–	–	–	–
HF cetaceans	173	0.19	0.11	–	–	0.2	0.12	0.19	0.11
Phocid seals	201	–	–	–	–	–	–	–	–
Otariid seals	219	–	–	–	–	–	–	–	–
Turtles	220	–	–	–	–	–	–	–	–
TTS									
LF cetaceans	179	0.31	0.31	1.01	0.35	0.95	2.78	0.31	0.66
MF cetaceans	178	0.13	0.05	–	–	0.16	0.06	0.13	0.05
HF cetaceans	153	1.07	3.44	1.01	0.18	1.09	3.86	1.06	3.64
Phocid seals	181	0.12	0.05			0.35	0.28	0.12	0.05
Otariid seals	199	–	–	–	–	–	–	–	–
Turtles	200	–	–	–	–	–	–	–	–

[A] Radial distance reported from the centre of the MODU, unless indicated otherwise.
[B] Frequency weighted.

A dash indicates the level was not reached within the limits of the modelling resolution (25 m).

Table 17. Difference in maximum (R_{max}) horizontal distances (in km) to frequency-weighted SEL_{24h} PTS and TTS thresholds based on NMFS (2018) and Finneran et al. (2017) between Koessler et al. (2020) and modelling completed using data from measurement study. Positive values indicate and increase in distance as compared to Koessler et al. (2020), negative values indicate a decrease.

Hearing group	SEL_{24h} threshold ($L_{E,24h}$; dB re 1 µPa²·s)†	MODU (Scenario 5)	OSV standby (Scenario 6)	MODU and OSV resupply (Scenario 7)	MODU and OSV standby (Scenario 8)
		R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)
PTS					
LF cetaceans	199	*	*	*	*
MF cetaceans	198	*	*	*	*
HF cetaceans	173	0.15	*	0.16	0.15
Phocid seals	201	*	*	*	*
Otariid seals	219	*	*	*	*
Turtles	220	*	*	*	*
TTS					
LF cetaceans	179	-0.61	-0.11	-1.78	-2.45
MF cetaceans	178	*	*		
HF cetaceans	153	0.47	-0.03	-1.59	0.02
Phocid seals	181	-0.09	*	0.14	-0.09
Otariid seals	199	*	*	*	*
Turtles	200	*	*	*	*

† Frequency weighted.

An asterisk indicates that the difference in radial distance could not be computed due to distances less than the modelled resolution.

7. Discussion and Conclusion

7.1. Ambient Soundscape

The insights into ambient soundscape within the Otway Basin and in the vicinity of the Development Drilling program can be obtained through the data recorded at Station 4, and in part, Station 3. Stations 1 and 2 are too close to the location of the Artisan-1 well and associated activity to provide any information about ambient noise while the *Ocean Onyx* is present. Whilst data exists outside the period in which the *Ocean Onyx* is present, this data includes noise from the moored rig anchor chains, which are not a typical soundscape contributor.

The correlograms (Section 5.2) show a positive correlation between wind speeds and wave heights and sound levels for frequencies over 100 Hz, with the relationship with wind speed being stronger than that for wave height. For both stations shipping is a strong contributor: most days recorded a significant number of vessel detections (Section 5.6), with the contributions at Station 4 apparent in the power spectral density and percentile plot (Figure 16), between 40 and approximately 100 Hz. If the support vessels for the Development Drilling program did not pass near Station 3 as often while under station keeping, the number of close vessel passes would have been less, and thus it is likely that the statistics presented in Table 10 would have reflected a soundscape with quieter sound levels on average.

In terms of monitoring work with the Otway and Bass Strait regions, between 2009 and 2016 the Integrated Marine Observing System (IMOS) has been recording underwater sound south of Portland, Victoria (38°32.5' S, 115°0.1'E). Prominent sound sources identified in recordings include blue and fin whales at frequencies below 100 Hz, ship noise at 20 to 200 Hz, and fish at 1 to 2 kHz (Erbe et al. 2016). In the broader region, primary contributors to background sound levels were wind, rain and currents-and waves-associated sound at low frequencies under 2 kHz (Przeslawski et al. 2016), and biological sound sources including dolphin vocalisations were also recorded.

To gain an understanding of the existing marine acoustic environment to inform the impact assessment for the Otway Gas Development, acoustic monitoring was undertaken by Woodside (2003). During April-May 2001, two underwater noise loggers were placed (5.1 km and 2.9 km) south-west of an exploration petroleum drilling vessel at the Thylacine site to measure underwater noise before, during, and after drilling activity. Only one of the loggers (5.9 km) was able to be recovered. A further logger was placed in the shipping lane approximately 60 kms due south of Port Fairy to measure ambient noise produced by physical, man-made and biological sources between late November 2001 and early March 2002.

A summary of the report states that the following features were noted with respect to underwater noise environment at the Thylacine location:

- Relatively quiet with only the passage of several boats (about ten) evident.
- The rig tender and drill rig noise show clearly from 13:00 on the 3 May 2001.
- Drill rig noise was evident as sharp tones.
- Rig tender noise was evident either at a low but persistent level for days or in short bursts of high level noise for several hours associated with manoeuvring, use of thrusters or as a close passage by the receiver.
- The horizontal banding characteristic of persistent calling by pygmy blue whales was not evident, rather these call types occurred infrequently and at low levels indicating the respective sources were at long range.
- Evidence of low-level, distant evening fish choruses only.

However, at the shipping lane location, it was noted:

- Regular passages of boats evident.
- Regular evening fish choruses, there were also dawn choruses and persistent low level calling by these sources over daytime.
- Blue whale calling persisted over many hours, an example is the first close passage for the season just before midday on 4 January 2002 followed by several more animals a day later.
- Evidence of calling from at least three other whale species.
- Baseline broadband underwater noise for the period was in the order of 93 to 97 dB re 1 µPa with shipping raising the averaged noise level above 105 dB re 1 µPa for 6% of the deployment time.

An acoustic monitoring program was also undertaken during exploratory drilling of the Casino-3 well. A sound logger located 28.03 km from the drill site did not detect drilling noise and recorded ambient noise that ranged between 90 and 110 dB re 1 µPa (McCauley 2004). Passive acoustic monitoring commissioned by Origin from April 2012 to January 2013, 5 km offshore from the coastline east of Warrnambool, identified that ambient underwater noise in coastal areas is generally higher than further offshore, with a mean of 110 dB re 1 µPa and maximum of 161 dB re 1 µPa.

JASCO has not reviewed these historical reports and the associated activity descriptions within them, or information on the vessels and MODU used, therefore direct comparison between the data collected during exploratory drilling of the Casino-3 well and the Artisan-1 well should be conducted with caution.

Comparing the results from a recorder 28.3 km from drilling operations at Casino 3 with Station 4, the results for Station 4 were a median broadband ambient noise of 104.5 dB re 1 µPa, a mean of 118.3 dB re 1 µPa, a minimum of 86.6 dB re 1 µPa, and a maximum of 153.6 dB re 1 µPa, which is both quieter and louder than those for Casino 3. The mean levels at Station 4 are 8.3 dB higher than those recorded 5 km offshore of Warrnambool, while the maximum recorded at Station 4 is lower by 7.4 dB. The use of percentiles, as provided in Section 5.1.1, Figure 16 and Table 10, in the context of contributors such as weather (Section 5.2), shipping (Section 5.6), and marine mammals (Section 5.7), provides a more nuanced understanding of sound levels received at a recording station. Local variations in ambient noise and received levels can depend upon water depth and the proximity to contributors In this case, the shipping lanes (Section 2.2) and the frequency and proximity of vessel passes are strong drivers of the ambient noise at Station 4. The use of Station 4 as a dedicated measurement location for the support vessels (Section 2.5.2) does not change the relevance of the results from this measurement location, as those vessels would still have been transiting at similar speeds and along similar tracks on trips between Geelong and Artisan-1. The quieter levels reported at Thylacine in Lattice Energy (2017) are likely due to the placement of the monitoring station at a distance from the shipping lanes (Figure 3), which limited their contributions to the data set and thus resulted in a lower reported range of received sound levels.

7.2. Modelling Validation

The Monopole Source Levels determined through the measurement study differed from those either estimated for use in the modelling study or those determined using proxy sources. The key differences are as follows:

- The support vessels are quieter than estimated when they are under slow transit speeds, such as 7 kn.
- The support vessels are louder than estimated when they are travelling at faster transit speeds, with 9 kn used to represent these speeds and the associated MSL.
- The support vessels are louder than estimated when holding station or moving under dynamic positioning.
- The drilling operations of the *Ocean Onyx* are both louder at some frequencies and quieter at others than those for the proxy rig the *Polar Pioneer* (Austin et al. 2018), although the results presented for the *Polar Pioneer* did not examine the changes in level with increased drilling depth (over time) as completed within this study.

The relationship between vessel speed and MSL is well known, with recent detailed examinations on shipping traffic associated with the Port of Vancouver (Joy et al. 2019, Trounce et al. 2019, JASCO Applied Sciences and SMRU Consulting 2020). Conducting the measurement campaign in deeper water, along with higher time resolution location reporting systems for the vessels, automated high time resolution engine information reporting, and a greater number of vessel passes at a range of speeds would further develop this dataset to allow for more accurate predictions of sound level in relation to vessel speed or operations. Predictions of sound levels using speed and operational state is preferred to estimates determined using scaling of power levels, particularly when considering the range of propulsion systems on the vessels.

The measurement of sound levels for vessels under DP is complex and time consuming. It requires dedicated operations in the absence of other activities, which is a challenge considering the task requirements of typical support and anchor handling vessels. Few studies have reported the MSL of support vessels under DP, with the majority estimating the RNL rather than MSL. The large range of thrusters and operational control systems and the variable source depths of each individual thruster contribute to the complexity of estimating source levels. Measurement studies are complicated by environmental conditions and the specifics of each vessel. The MSLs calculated from each of the three DP exercises defined (Section 2.5.2) were very similar. However, the ability to replicate these across different weather conditions and position holding constraints would likely provide valuable information which could help contextualise future modelling studies.

The MSLs reported within this study can be used as inputs to modelling studies for other operations for the same or similar vessels or MODU's. However, the reported ranges to thresholds are specific to the Artisan-1 well location, and not transferrable to other locations, particularly in different water depths, geologic environments, and sound speed profiles. The approach developed to represent the propagation loss based upon the measurement results is suitable for other locations within the continental shelf portion of the Otway Basin. However, the accuracy of the representation of the propagation loss within this environment depends significantly upon the frequency content of the radiating sound source together with thickness of the sand layer on the calcarenite seabed within the region. In general, the thinner the sand layer, the greater the propagation loss.

The agreement between VSTACK and MONM would be expected depend on the level and frequency content of the modelled source and the thickness of any unconsolidated sediments at the seafloor as low frequency energy will be less sensitive to thin layers. For the comparison conducted here in Section 6.2, the comparison between VSTACK and MONM is excellent when only a comparatively thin 1 m thick layer of sand overlies the carbonate seabed structure. If the data decay rates were more

indicative of propagation over a layer of sediment, then MONM could have been used without correction.

The distances to the effect thresholds based on the measurement study results (Section 6.3) are reduced compared to those presented in Koessler et al. (2020). The understanding of the environment gained through the measurement study allowed for the geological environment to be represented in a site specific fashion, and a more appropriate configuration of numerical models to represent the propagation loss. The application of the revised modelling approach to represent other Beach Energy activities on the continental shelf of the Otway Basin would be appropriate.

7.3. Development Drilling Program Contributions

Soundscape contributions of the Development Drilling operations were activity-dependent and depended upon proximity to both the *Ocean Onyx* and associated support vessels. At the three closest stations, the relative contributions are demonstrated through the LTSAs and percentiles for the entire period the *Ocean Onyx* was operational at Artisan-1, and two presented example periods. One of the presented example periods involved significant contributions to the sound fields at the three stations close to the rig presented in Section 5.1.1, as well as considering the per station daily SELs (Section 5.1.2).

A better understanding of the contributions from the Development Drilling operations on a regional scale is provided through the data recorded at Station 4, 25 km from the *Ocean Onyx* (whilst drilling operations were being conducted at Artisan-1), and they did not appear to be a significant contributor to the overall soundscape. While the operational contributions were not significant at Station 4, they were apparent throughout different stages of the activity. At long ranges, the contribution from the drilling itself is hard to distinguish from associated vessel operations, complicated by support vessels manoeuvring over an area greater than 100 km^2. The support vessels operating under dynamic position while completing tasks at Artisan-1 which required high thrust levels, such as anchor handling and accurate station keeping in high sea states, were apparent at Station 4 (for example Figure 44). The configuration of Station 4 to be able to present received signals with the context of direction allowed for the attribution of signals to specific sources. Whilst the recording station 28 km from the Casino 3 drilling operation reported in Lattice Energy (2017) was not able to detect drilling noise, the analysis would not have been able to attribute detected vessel noise to the support vessels for the rig. Therefore, it is likely that the Casino 3 monitoring program recorded noise associated with the drilling program but was unable to attribute it due to the lack of context provided by single omni-directional hydrophone recorder configurations (similar to Stations 1–3).

Periods with less dynamic positioning utilisation, such as between 17:00 and 18:39 on 8 Mar 2021, ShipSound report in Appendix G.1.2, with the spectrogram shown in Figure 37, had only faint potential contributions noticeable at Station 4 (Figure 67). In this figure, long tonals which originate in a north-west direction (the direction of Artisan-1) are apparent between 100 and 250 Hz. However, these are not apparent in data at Station 1 (Figure 37), and thus potentially do not originate close to the rig. In addition to these tonals, the spectrogram shown in Figure 67 shows periods of rain, the approach of the 17 m long sailing boat *Zatara* (Figure 68), which passes within 686 m of Station 4 at a speed of 8 kn, and a likely fish chorus between 800 and 1000 Hz from the north-west.

The rig move operations were apparent, similarly to other periods of high thrust levels, with contributions from the support vessels throughout the tow period matching the relative direction received at Station 4 (Figures 69 and 70). The frequency range, which was still typically detectable at long ranges, 100 to up to 1000 Hz, is above the frequency range for the fundamentals and primary harmonics for pygmy blue whale vocalisations (Section 5.7.2), as shown in Figure 69. Therefore, the potential effect on the communication and listening space (Hannay et al. 2016a), and thus masking, at

longer ranges is less apparent than it is for seismic survey activity, or regions in which low frequency signals experience less loss then they do in locations with highly absorptive seabeds.

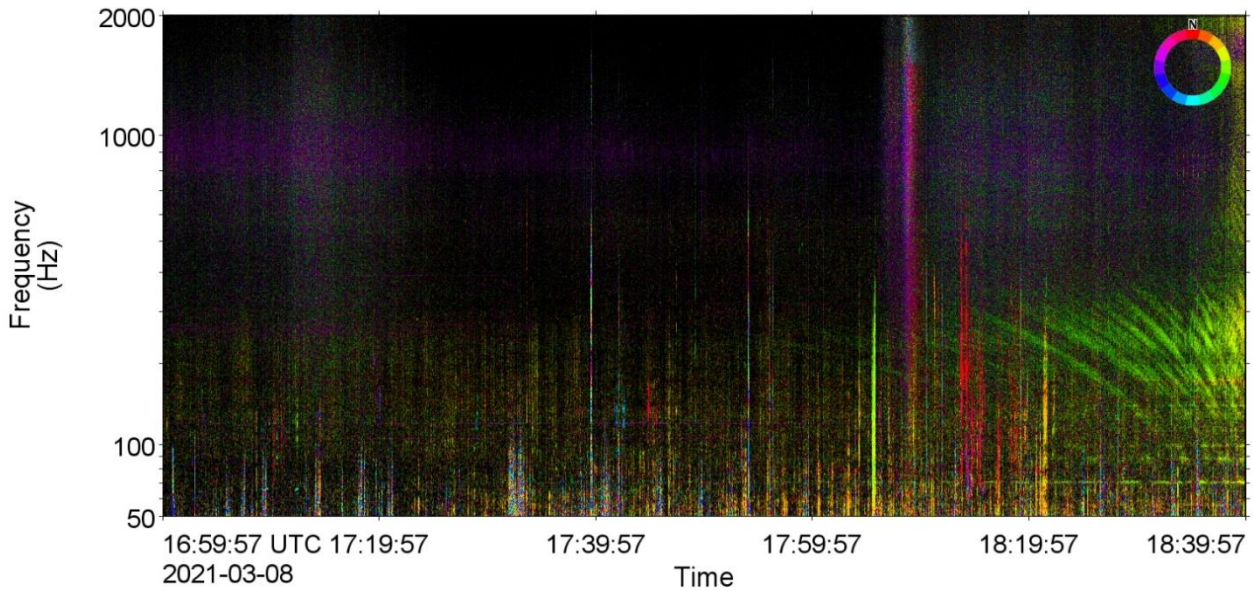


Figure 67. Data recorded on Station 4 including *Ocean Onyx* ShipSound analysis reports between 17:00 and 18:39 on 8 Mar 2021, ShipSound report in Appendix G.1.2, with the spectrogram shown in Figure 37 (0.4 Hz frequency resolution, 2 s time window, 0.5 s time step, Hamming window, normalised across time).

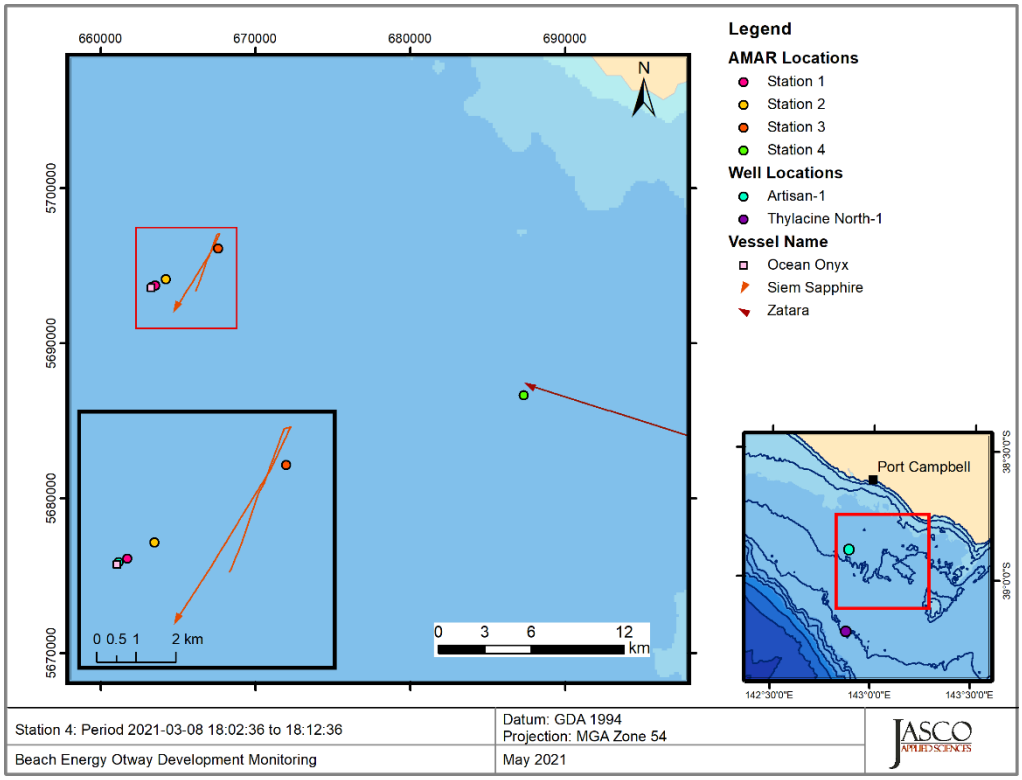


Figure 68. Map of AIS reported vessel locations for the spectrogram shown in Figure 67.

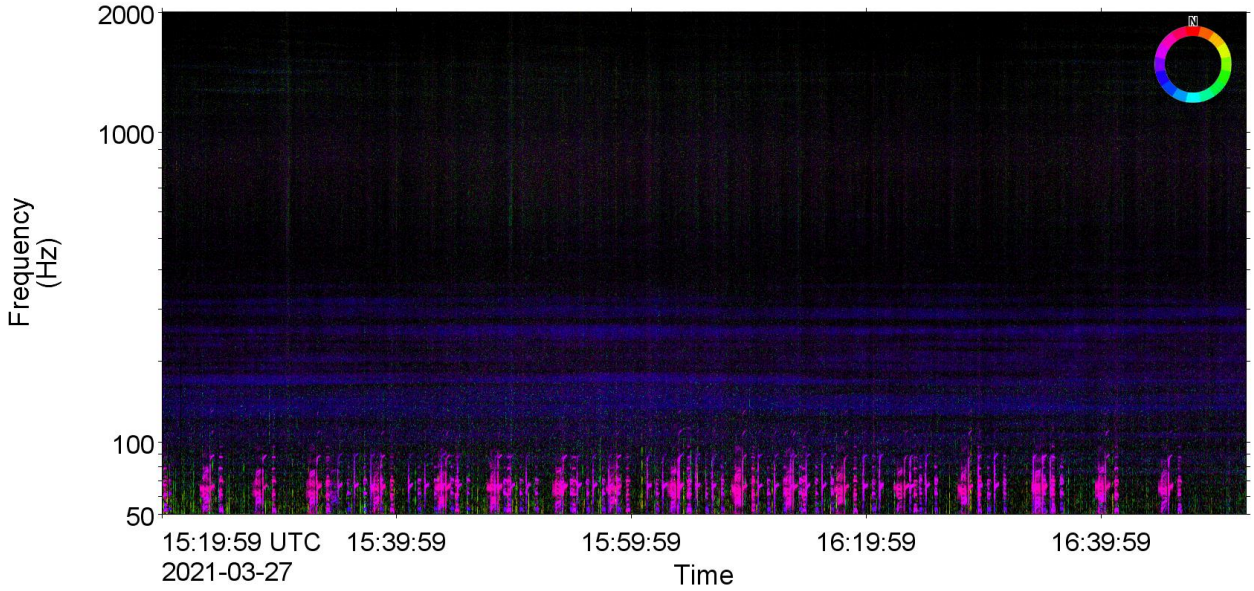


Figure 69. Example of the contribution of the three support vessels and the *Ocean Onyx* while ~23 km away in a south-west direction under tow from Artisan-1 to Geographe, apparent via the blue horizontal striations between 100 and 500 Hz, along with multiple pygmy blue whales in a west to north-west direction of Station 4 (0.4 Hz frequency resolution, 2 s time window, 0.5 s time step, Hamming window, normalised across time).

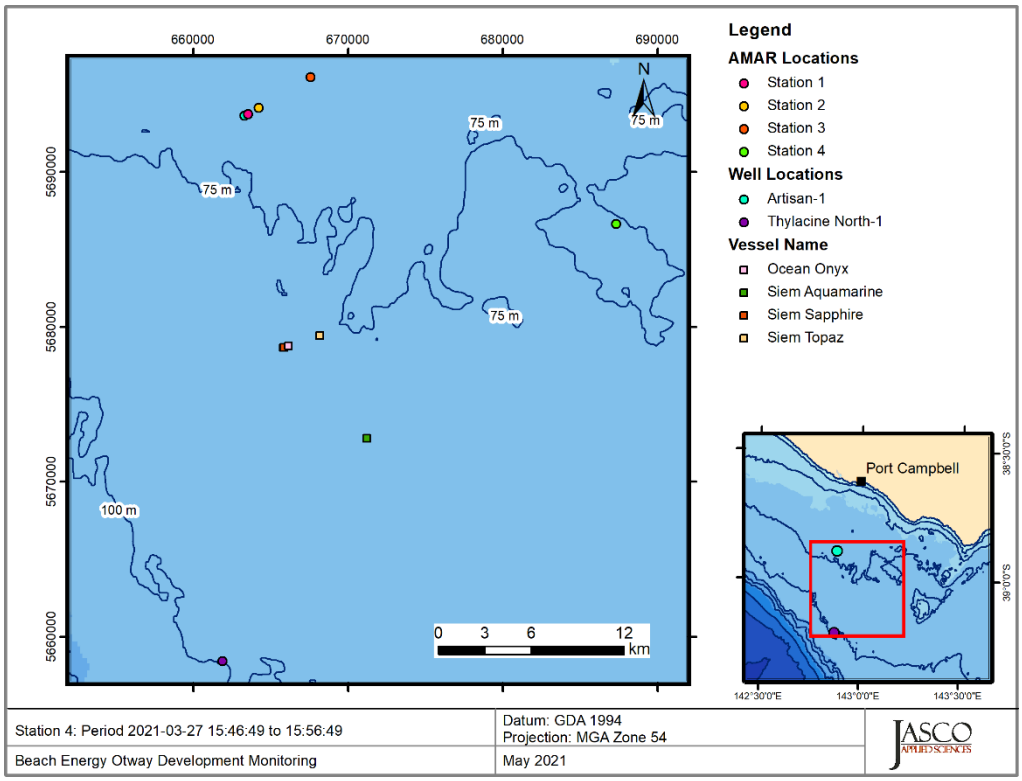


Figure 70. Map of automatic identification system (AIS) reported vessel locations for the spectrogram shown in Figure 69.

7.4. Marine Mammals

The marine mammal acoustic detection results presented in this report provide an index of acoustic occurrence for each species. Although they can be used to describe the relative occurrence of a species, several factors influence the detectability of the targeted signals. Although acoustic detection does indicate presence, an absence of detections (automated or manual) does not necessarily indicate an absence of animals. An animal may be present but not detected if no individuals were vocalising near the recorder, their signals were masked by environmental and/or anthropogenic noise sources, or a combination of these factors. Different sound propagation environments and different seasonal effects will impact the detection range of a given signal over time and, therefore, influence the number of detectable signals. The acoustic signals of both dolphins and pygmy blue whales were present in the acoustic data. vVcalisations of other mysticetes, such as humpback and southern right whales, were not detected by the detectors (D.2), or observed during the 0.5% manual review.

7.4.1. Dolphins

Dolphin species reported in offshore Victorian waters include the short-beaked common and bottlenose dolphins (Bilgmann et al. 2007, Bilgmann et al. 2014). Burrunan dolphins (*Tursiops australis*) can also occur in the region (Charlton-Robb et al. 2015), although they are likely more coastal. While it would be ideal to discriminate between species, success has been limited using automated detectors, and the detailed manual analysis required to attempt to identify individual species is beyond the scope of this report (Steiner 1981, Rendell et al. 1999, Oswald et al. 2003, Baron et al. 2008).

Based on the occurrence of echolocation clicks and whistles, dolphins occurred in the area throughout the recording period at all stations. Dolphin acoustic occurrence was low in February and increased through March at Stations 1, 2, and 3. In contrast, dolphins were consistently present at an almost hourly basis at Station 4. It is impossible to say whether the sparsity of dolphins at Stations 2 and 3 in February is a result of the animals not being common or of their signals being masked by the high noise environment (Figure 16).

The predominance of delphinid clicks during hours of darkness could correspond to foraging on prey species that follow the diel vertical migrations of zooplankton. Similar patterns have been observed in studies of a number of whale species (Víkingsson 1997, Au et al. 2000, Wiggins et al. 2005, Baumgartner and Fratantoni 2008, Sayigh et al. 2013) and by JASCO in studies conducted in northern Australian waters (McPherson et al. 2012, McPherson et al. 2014, McPherson et al. 2016). However, recent research suggests that though such patterns are common, they may not be as closely linked to prey as previously thought (Osiecka et al. 2020).

The presence of sounds believed to be produced by young bottlenose dolphins suggests that not only were dolphins using this region to socialize (indicated by presence of whistles) and forage (indicated by presence of clicks), but they also care for their young.

7.4.2. Pygmy Blue Whales

The acoustic occurrence of pygmy blue whale vocalisations in the acoustic data was unsurprising as they have previously been reported in the region and the Bonney Upwelling is a known foraging area for this species (Garcia-Rojas et al. 2018, McCauley et al. 2018, Möller et al. 2020). Tag data indicates that blue whales are most common in the recording area between January and July, coinciding with the upwelling season of the region (Möller et al. 2020). The lack of clear directional movement during the recording period is unsurprising given both the small sample size and that this area is believed to be a location where blue whales aggregate, as opposed to a migratory corridor where a more consistent pattern in direction over time would be expected. The data does indicate an apparent trend in the animals early in the recording being more to the east and later in the recording being more to the west, but the data were too sparse to confirm anything about animal movements. A monitoring program with directional stations distributed across the Otway Basin would be able to provide this information.

The presence of songs indicates the presence of male pygmy blue whales and the increased regularity of songs at the end of March at all stations corresponds with the onset of the winter singing season for this species (McCauley et al. 2018). Indeed, we cannot say whether the increased vocal activity in March is a result of increased animals in the region or a shift in acoustic behaviour. The blue whale occurrence results were extremely similar across recording stations which is unsurprising given the close vicinity of the recorders that were likely simultaneously recording the same blue whale vocalisations which can propagate great distances, as demonstrated for both pygmy and Antarctic blue whales (Gavrilov and McCauley 2013, Miller et al. 2013, Warren et al. 2021). It is believed that non-song D calls can be produced by male or female blue whales, and it may be a social call (Recalde-Salas et al. 2014).

Acknowledgements

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Glossary

1/3-octave

One third of an octave. Note: A one-third octave is approximately equal to one decidecade (1/3 oct ≈ 1.003 ddec; ISO 2017a).

1/3-octave-band

Frequency band whose bandwidth is one one-third octave. Note: The bandwidth of a one-third octave-band increases with increasing centre frequency.

90%-energy time window

The time interval over which the cumulative energy rises from 5 to 95% of the total pulse energy. This interval contains 90% of the total pulse energy. Symbol: T_{90}.

90% sound pressure level (90% SPL)

The root-mean-square sound pressure levels calculated over the 90%-energy time window of a pulse. Used only for pulsed sounds.

absorption

The reduction of acoustic pressure amplitude due to acoustic particle motion energy converting to heat in the propagation medium.

ambient noise

All-encompassing sound at a given place, usually a composite of sound from many sources near and far (ANSI S1.1-1994 (R2004)), e.g., shipping vessels, seismic activity, precipitation, sea ice movement, wave action, and biological activity.

annotation

A labelled selection of a period of time and frequency within a spectrogram as created by a human analyst during **manual analysis**.

attenuation

The gradual loss of acoustic energy from absorption and scattering as sound propagates through a medium.

audiogram

A graph of hearing threshold level (sound pressure levels) as a function of frequency, which describes the hearing sensitivity of an animal over its hearing range.

audiogram weighting

The process of applying an animal's audiogram to sound pressure levels to determine the sound level relative to the animal's hearing threshold (HT). Unit: dB re HT.

Auditory frequency weighting (auditory weighting function, frequency-weighting function)

The process of band-pass filtering sounds to reduce the importance of inaudible or less-audible frequencies for individual species or groups of species of aquatic mammals (ISO 2017a). One example is M-weighting introduced by Southall et al. (2007) to describe "Generalised frequency weightings for various functional hearing groups of marine mammals, allowing for their functional bandwidths and appropriate in characterizing auditory effects of strong sounds".

automated detection

The output of an **automated detector**.

automated detector

An algorithm that includes both the **automated detection** of a sound of interest based on how it stands out from the background and its automated classification based on similarities to templates in a library of reference signals.

background noise

Total of all sources of interference in a system used for the production, detection, measurement, or recording of a signal, independent of the presence of the signal (ANSI S1.1-1994 (R2004)). Ambient noise detected, measured, or recorded with a signal is part of the background noise.

bandwidth

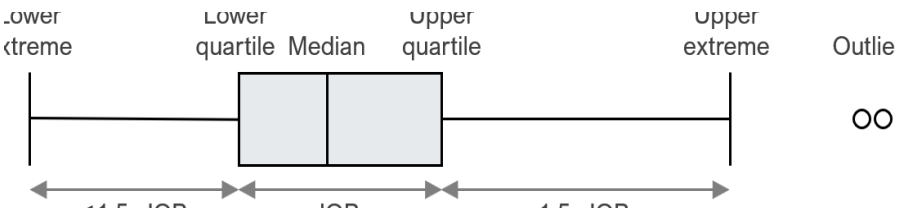
The range of frequencies over which a sound occurs. Broadband refers to a source that produces sound over a broad range of frequencies (e.g., seismic airguns, vessels) whereas narrowband sources produce sounds over a narrow frequency range (e.g., sonar) (ANSI and ASA S1.13-2005 (R2010)).

bar

Unit of pressure equal to 100 kPa, which is approximately equal to the atmospheric pressure on Earth at sea level. 1 bar is equal to 10^5 Pa or 10^{11} µPa.

box-and-whisker plot

A plot that illustrates the centre, spread, and overall range of data from a visual 5-number summary. The box is the interquartile range (IQR), which shows the middle 50% of the data—from the lower quartile (25th percentile) to the upper quartile (75th percentiles). The line inside the box is the median (50th percentile). The whiskers show the lower and upper extremes excluding outliers, which are data points that fall more than 1.5 × IQR beyond the upper and lower quartiles.



broadband sound level

The total sound pressure level measured over a specified frequency range. If the frequency range is unspecified, it refers to the entire measured frequency range.

cavitation

A rapid formation and collapse of vapor cavities (i.e., bubbles or voids) in water, most often caused by a rapid change in pressure. Fast-spinning vessel propellers typically cause cavitation, which creates a lot of noise.

cetacean

Any animal in the order Cetacea. These are aquatic, mostly marine mammals and include whales, dolphins, and porpoises.

continuous sound

A sound whose sound pressure level remains above ambient sound during the observation period (ANSI and ASA S1.13-2005 (R2010)). A sound that gradually varies in intensity with time, for example, sound from a marine vessel.

decade

Logarithmic frequency interval whose upper bound is ten times larger than its lower bound (ISO 2006).

decidecade

One tenth of a decade (ISO 2017a). Note: An alternative name for decidecade (symbol ddec) is “one-tenth decade”. A decidecade is approximately equal to one third of an octave (1 ddec ≈ 0.3322 oct) and for this reason is sometimes referred to as a “one-third octave”.

decidecade band

Frequency band whose bandwidth is one decidecade. Note: The bandwidth of a decidecade band increases with increasing centre frequency.

decibel (dB)

One-tenth of a bel. Unit of level when the base of the logarithm is the tenth root of ten, and the quantities concerned are proportional to power ([ANSI] American National Standards Institute S1.1-1994 (R2004)).

delphinid

Family of oceanic dolphins, or Delphinidae, composed of approximately thirty extant species, including dolphins, porpoises, and killer whales.

duty cycle

The time when sound is periodically recorded by an acoustic recording system.

far-field

The zone where, to an observer, sound originating from an array of sources (or a spatially distributed source) appears to radiate from a single point. The distance to the acoustic far-field increases with frequency.

fast-average sound pressure level

The time-averaged sound pressure levels calculated over the duration of a pulse (e.g., 90%-energy time window), using the leaky time integrator from Plomp and Bouman (1959) and a time constant of 125 ms. Typically used only for pulsed sounds.

fast Fourier transform (FFT)

A computationally efficiently algorithm for computing the discrete Fourier transform.

frequency

The rate of oscillation of a periodic function measured in cycles-per-unit-time. The reciprocal of the period. Unit: hertz (Hz). Symbol: *f*. 1 Hz is equal to 1 cycle per second.

hearing group

Groups of marine mammal species with similar hearing ranges. Commonly defined functional hearing groups include low-, mid-, and high-frequency cetaceans, pinnipeds in water, and pinnipeds in air.

harmonic

A sinusoidal sound component that has a frequency that is an integer multiple of the frequency of a sound to which it is related. For example, the second harmonic of a sound has a frequency that is double the fundamental frequency of the sound.

hearing threshold

The sound pressure level for any frequency of the hearing group that is barely audible for a given individual in the absence of significant background noise during a specific percentage of experimental trials.

hertz (Hz)

A unit of frequency defined as one cycle per second.

high-frequency (HF) cetacean

The functional cetacean hearing group that represents those odontocetes (toothed whales) specialised for hearing high frequencies.

hydrophone

An underwater sound pressure transducer. A passive electronic device for recording or listening to underwater sound.

intermittent sound

A level of sound that abruptly drops to the background noise level several times during the observation period.

impulsive sound

Sound that is typically brief and intermittent with rapid (within a few seconds) rise time and decay back to ambient levels (NOAA 2013, ANSI S12.7-1986 (R2006)). For example, seismic airguns and impact pile driving.

low-frequency (LF) cetacean

The functional cetacean hearing group that represents mysticetes (baleen whales) specialised for hearing low frequencies.

manual analysis

Human examination of acoustic data via visual review of spectrograms and/or aural inspection of data.

manual detection

The output of **manual analysis** as recorded in an **annotation**.

masking

Obscuring of sounds of interest by sounds at similar frequencies.

mean-square sound pressure spectral density

Distribution as a function of frequency of the mean-square sound pressure per unit bandwidth (usually 1 Hz) of a sound having a continuous spectrum (ANSI S1.1-1994 (R2004)). Unit: $\mu Pa^2/Hz$.

median

The 50th percentile of a statistical distribution.

mid-frequency (MF) cetacean

The functional cetacean hearing group that represents those odontocetes (toothed whales) specialised for mid-frequency hearing.

mysticete

Mysticeti, a suborder of cetaceans, use their baleen plates, rather than teeth, to filter food from water. They are not known to echolocate, but they use sound for communication. Members of this group include rorquals (Balaenopteridae), right whales (Balaenidae), and grey whales (*Eschrichtius robustus*).

non-impulsive sound

Sound that is broadband, narrowband or tonal, brief or prolonged, continuous or intermittent, and typically does not have a high peak pressure with rapid rise time (typically only small fluctuations in decibel level) that impulsive signals have (ANSI S3.20-1995 (R2008)). For example, marine vessels, aircraft, machinery, construction, and vibratory pile driving (NIOSH 1998, NOAA 2015).

octave

The interval between a sound and another sound with double or half the frequency. For example, one octave above 200 Hz is 400 Hz, and one octave below 200 Hz is 100 Hz.

odontocete

The presence of teeth, rather than baleen, characterizes these whales. Members of the Odontoceti are a suborder of cetaceans, a group comprised of whales, dolphins, and porpoises. The skulls of toothed whales are mostly asymmetric, an adaptation for their echolocation. This group includes sperm whales, killer whales, belugas, narwhals, dolphins, and porpoises.

peak pressure level (PK)

The maximum instantaneous sound pressure level, in a stated frequency band, within a stated period. Also called zero-to-peak pressure level. Unit: decibel (dB).

percentile level, exceedance

The sound level exceeded *n* % of the time during a measurement.

permanent threshold shift (PTS)

A permanent loss of hearing sensitivity caused by excessive noise exposure. PTS is considered auditory injury.

pinniped

A common term used to describe all three groups that form the superfamily Pinnipedia: phocids (true seals or earless seals), otariids (eared seals or fur seals and sea lions), and walrus.

power spectrum density

Generic term, formally defined as power in W/Hz, but sometimes loosely used to refer to the spectral density of other parameters such as square pressure or time-integrated square pressure.

pressure, acoustic

The deviation from the ambient hydrostatic pressure caused by a sound wave. Also called overpressure. Unit: pascal (Pa). Symbol: *p*.

received level (RL)

The sound level measured (or that would be measured) at a defined location.

rms

root-mean-square.

signature

Pressure signal generated by a source.

sound

A time-varying pressure disturbance generated by mechanical vibration waves travelling through a fluid medium such as air or water.

sound exposure

Time integral of squared, instantaneous frequency-weighted sound pressure over a stated time interval or event. Unit: pascal-squared second ($Pa^2 \cdot s$) (ANSI S1.1-1994 (R2004)).

sound exposure level (SEL)

A cumulative measure related to the sound energy in one or more pulses. Unit: dB re 1 $\mu Pa^2 \cdot s$. SEL is expressed over the summation period (e.g., per-pulse SEL [for airguns], single-strike SEL [for pile drivers], 24-hour SEL).

sound exposure spectral density

Distribution as a function of frequency of the time-integrated squared sound pressure per unit bandwidth of a sound having a continuous spectrum (ANSI S1.1-1994 (R2004)). Unit: $\mu Pa^2 \cdot s/Hz$.

sound pressure level (SPL)

The decibel ratio of the time-mean-square sound pressure, in a stated frequency band, to the square of the reference sound pressure (ANSI S1.1-1994 (R2004)).

For sound in water, the reference sound pressure is one micropascal (p_0 = 1 μPa) and the unit for SPL is dB re 1 μPa^2:

$$L_p = 10\log_{10}(p^2/p_0^2) = 20\log_{10}(p/p_0)$$

Unless otherwise stated, SPL refers to the root-mean-square (rms) pressure level. See also 90% sound pressure level and fast-average sound pressure level. Non-rectangular time window functions may be applied during calculation of the rms value, in which case the SPL unit should identify the window type.

source level (SL)

The sound level measured in the far-field and scaled back to a standard reference distance of 1 metre from the acoustic centre of the source. Unit: dB re 1 μPa·m (pressure level) or dB re 1 $\mu Pa^2 \cdot s \cdot m$ (exposure level).

spectral density level

The decibel level ($10 \cdot \log_{10}$) of the spectral density of a given parameter such as SPL or SEL, for which the units are dB re 1 $\mu Pa^2/Hz$ and dB re 1 $\mu Pa^2 \cdot s/Hz$, respectively.

spectrogram

A visual representation of acoustic amplitude compared with time and frequency.

spectrum

An acoustic signal represented in terms of its power, energy, mean-square sound pressure, or sound exposure distribution with frequency.

validated detection

The output of an **automated detector** that has been subsequently validated by a human analyst.

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Appendix A. Underwater Acoustics

A.1. Acoustic Metrics

Sound levels with individual metrics defined below, are presented as:

- Broadband and approximate-decade-band SPL over time for these frequency bands for the low sample rate: 10 Hz–32 kHz (Nyquist), 10–100 Hz, 100 Hz to 1 kHz, 1–10 kHz, and 10–32 kHz. For the high sample rate, the Nyquist is 256 kHz.
- Spectrograms: Ambient noise at each station was analysed by Hamming-windowed fast Fourier transforms (FFTs), with 1 Hz resolution and 50% window overlap. The 120 FFTs performed with these settings are averaged to yield 1 min average spectra.
- Statistical distribution of SPL in each decidecade. The boxes of the statistical distributions indicate the first (L_5), second (L_{50}), and third (L_{75}) quartiles. The whiskers indicate the maximum and minimum range of the data. The solid line indicates the sound pressure level (SPL) or L_{eq} in each decidecade.
- Spectral level percentiles: Histograms of each frequency bin per 1 min of data. The L_{eq}, L_5, L_{25}, L_{50}, L_{75}, and L_{95} percentiles are plotted. The L_5 percentile curve is the frequency-dependent level exceeded by 95% of the 1 min averages. Equivalently, 5% of the 1 min spectral levels are above the 95th percentile curve.
- Daily cumulative sound exposure levels (SEL (24 h)): computed for the total received sound energy. The SEL (24 h) is the linear sum of the 1 min sound exposure levels (SEL). These SEL values were weighted to mimic different functional hearing groups according to the marine mammal frequency-weighted curves described in Appendix E.

Sound is most commonly described using the sound pressure level (SPL) metric. Underwater sound amplitude levels are commonly measured in decibels (dB) relative to a fixed reference pressure of p_0 = 1 µPa.

SPL (dB re 1 µPa) is the decibel level of the rms pressure in a stated frequency band over a time window (T; s) containing the acoustic event:

$$\mathrm{SPL} = 10\log_{10}\left(\frac{1}{T}\int_T p^2(t)\,dt \Big/ p_0^2\right) \tag{A-1}$$

The SPL is a measure of the effective pressure level over the duration of an acoustic event, such as the emission of one acoustic pulse or sweep. Because the window length, T, is the divisor, events more spread out in time have a lower SPL even though they may have similar total acoustic energy density.

Power spectral density (PSD) level is a description of how the acoustic power is distributed over different frequencies within a spectrum. It is expressed in dB re 1 µPa²/Hz.

The sound exposure level (SEL, dB re 1 µPa²·s) is a measure of the total acoustic energy contained in one or more acoustic events. The SEL for a single event is computed from the time-integral of the squared pressure over the full event duration (T_{100}):

$$\mathrm{SEL} = 10\log_{10}\left(\int_{T_{100}} p^2(t)\,dt \Big/ T_0 p_0^2\right) \tag{A-2}$$

where T_0 is a reference time interval of 1 s. The SEL represents the total acoustic energy received at a location during an acoustic event; it measures the total sound energy an organism at that location would be exposed to.

Because the SPL and SEL are both computed from the integral of square pressure, these metrics are related by the following expression, which depends only on the duration of the energy time window T:

$$\mathrm{SPL} = \mathrm{SEL} - 10\log_{10}(T) \tag{A-3}$$

Sound level statistics, namely percentiles, were used to quantify the distribution of recorded sound levels. The *n*th percentile level (L_n) is the level (i.e., PSD level, SPL, or SEL) *n*% of the data are below this level. L_{eq} is the linear arithmetic mean of the sound power, which can be substantially different from the median sound level L_{50}. SPL can also be referred to as L_{eq}, which stands for 'equivalent level'. The two terms are used interchangeably throughout. L_{95}, the level exceeded by only 5% of the data, represents the highest typical sound levels measured. Sound levels between L_5 and L_{99} are generally from very close passes of vessels, very intense weather events, and other infrequent conditions. L_5 represents the quietest typical conditions.

Appendix B. Acoustic Data Analysis Methods

The data sampled at 64 kHz and 512 kHz was processed for ambient sound analysis, vessel noise detection, and detection of all marine mammal vocalisations. This section describes the ambient, vessel, and marine mammal detection algorithms employed (Figure B-1).

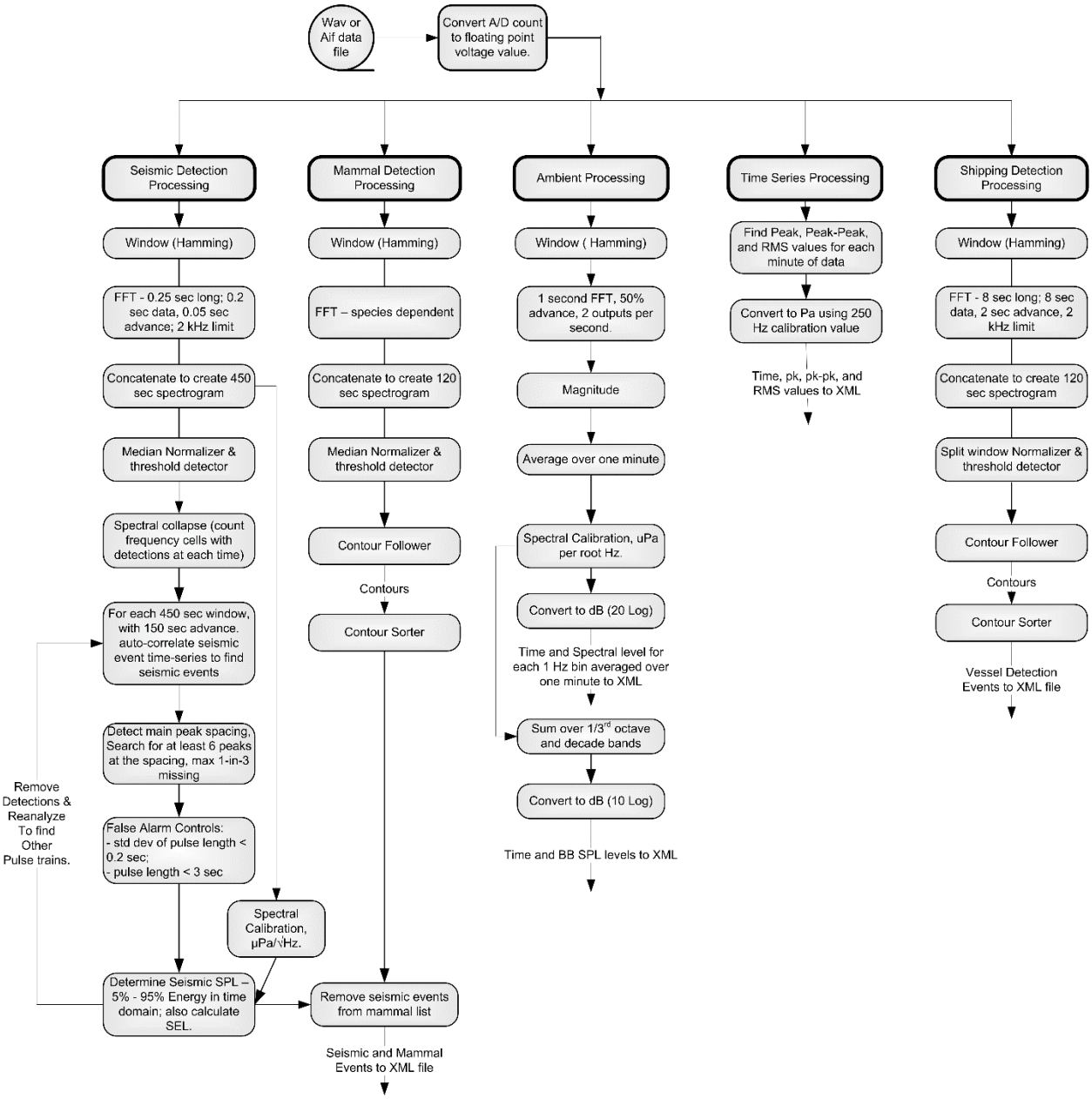


Figure B-1. Major stages of the automated acoustic analysis process performed with JASCO's custom software suite.

B.1. Total Ambient Sound Levels

Underwater sound pressure amplitude is measured in decibels (dB) relative to a fixed reference pressure of p_0 = 1 µPa. Because the perceived loudness of sound, especially impulsive noise such as from seismic airguns, pile driving, and sonar, is not generally proportional to the instantaneous acoustic pressure, several sound level metrics are commonly used to evaluate noise and its effects on marine life. We provide specific definitions of relevant metrics used in this report. Where possible we follow the ANSI and ISO standard definitions and symbols for sound metrics, but these standards are not always consistent.

The zero-to-peak pressure level, or peak pressure level (PK or $L_{p,pk}$; dB re 1 µPa), is the decibel level of the maximum instantaneous sound pressure level in a stated frequency band attained by an acoustic pressure signal, $p(t)$:

$$\mathrm{PK} = L_{p,\mathrm{pk}} = 10\log_{10}\frac{\max|p^2(t)|}{p_0^2} \tag{B-6}$$

PK is often included as criterion for assessing whether a sound is potentially injurious; however, because it does not account for the duration of a noise event, it is generally a poor indicator of perceived loudness.

The sound pressure level (SPL or L_p; dB re 1 µPa) is the decibel level of the root-mean-square (rms) pressure in a stated frequency band over a specified time window (T; s) containing the acoustic event of interest. It is important to note that SPL always refers to an rms pressure level and therefore not instantaneous pressure:

$$\mathrm{SPL} = L_p = 10\log_{10}\left[\frac{1}{T}\int_T p^2(t)\,dt \Big/ p_0^2\right] \tag{B-7}$$

The SPL represents a nominal effective continuous sound over the duration of an acoustic event, such as the emission of one acoustic pulse, a marine mammal vocalisation, the passage of a vessel, or over a fixed duration. Because the window length, T, is the divisor, events with similar sound exposure level (SEL), but more spread out in time have a lower SPL.

The sound exposure level (SEL or L_E, dB re 1 µPa^2·s) is a measure related to the acoustic energy contained in one or more acoustic events (N). The SEL for a single event is computed from the time-integral of the squared pressure over the full event duration (T):

$$\mathrm{SEL} = L_E = 10\log_{10}\left[\int_T p^2(t)\,dt \Big/ T_0 p_0^2\right] \tag{B-8}$$

where T_0 is a reference time interval of 1 s. The SEL continues to increase with time when non-zero pressure signals are present. It therefore can be construed as a dose-type measurement, so the integration time used must be carefully considered in terms of relevance for impact to the exposed recipients.

SEL can be calculated over periods with multiple events or over a fixed duration. For a fixed duration, the square pressure is integrated over the duration of interest. For multiple events, the SEL can be computed by summing (in linear units) the SEL of the N individual events:

$$L_{E,N} = 10\log_{10}\sum_{i=1}^{N} 10^{\frac{L_{E,i}}{10}} \tag{B-9}$$

To compute the SPL(T_{90}) and SEL of acoustic events in the presence of high levels of background noise, equations B-6 and B-7 are modified to subtract the background noise contribution:

$$\mathrm{SPL}(T_{90}) = L_{p90} = 10\log_{10}\left[\frac{1}{T_{90}}\int_{T_{90}}\left(p^2(t) - \overline{n^2}\right)dt \Big/ p_0^2\right] \quad \text{(B-10)}$$

$$L_E = 10\log_{10}\left[\int_{T}\left(p^2(t) - \overline{n^2}\right)dt \Big/ T_0 p_0^2\right] \quad \text{(B-11)}$$

where $\overline{n^2}$ is the mean square pressure of the background noise, generally computed by averaging the squared pressure of a temporally-proximal segment of the acoustic recording during which acoustic events are absent (e.g., between pulses).

Because the SPL(T_{90}) and SEL are both computed from the integral of square pressure, these metrics are related numerically by the following expression, which depends only on the duration of the time window T:

$$L_p = L_E - 10\log_{10}(T) \quad \text{(B-12)}$$

$$L_{p90} = L_E - 10\log_{10}(T_{90}) - 0.458 \quad \text{(B-13)}$$

where the 0.458 dB factor accounts for the 10% of SEL missing from the SPL(T_{90}) integration time window.

Energy equivalent SPL (dB re 1 µPa) denotes the SPL of a stationary (constant amplitude) sound that generates the same SEL as the signal being examined, $p(t)$, over the same period of time, T:

$$L_{\mathrm{eq}} = 10\log_{10}\left[\frac{1}{T}\int_{T} p^2(t)\,dt \Big/ p_0^2\right] \quad \text{(B–14)}$$

The equations for SPL and the energy-equivalent SPL are numerically identical; conceptually, the difference between the two metrics is that the former is typically computed over short periods (typically of 1 s or less) and tracks the fluctuations of a non-steady acoustic signal, whereas the latter reflects the average SPL of an acoustic signal over times typically of one minute to several hours.

B.2. Decidecade Band Analysis

The distribution of a sound's power with frequency is described by the sound's spectrum. The sound spectrum can be split into a series of adjacent frequency bands. Splitting a spectrum into 1 Hz wide bands, called passbands, yields the power spectral density of the sound. These values directly compare to the Wenz curves, which represent typical deep ocean sound levels (Figure 9) (Wenz 1962). This splitting of the spectrum into passbands of a constant width of 1 Hz, however, does not represent how animals perceive sound.

Because animals perceive exponential increases in frequency rather than linear increases, analysing a sound spectrum with passbands that increase exponentially in size better approximates real-world scenarios. In underwater acoustics, a spectrum is commonly split into decidecade bands, which are one tenth of a decade wide. A decidecade is sometimes referred to as a "1/3-octave" because one tenth of a decade is approximately equal to one third of an octave. Each decade represents a factor 10 in sound frequency. Each octave represents a factor 2 in sound frequency. The centre frequency of the ith band, $f_{\mathrm{c}}(i)$, is defined as:

$$f_{\mathrm{c}}(i) = 10^{\frac{i}{10}}\ \mathrm{kHz} \quad \text{(B-1)}$$

and the low (f_{lo}) and high (f_{hi}) frequency limits of the ith decade band are defined as:

$$f_{\mathrm{lo},i} = 10^{\frac{-1}{20}} f_{\mathrm{c}}(i) \quad \text{and} \quad f_{\mathrm{hi},i} = 10^{\frac{1}{20}} f_{\mathrm{c}}(i) \tag{B-2}$$

The decidecade bands become wider with increasing frequency, and on a logarithmic scale the bands appear equally spaced (Figure B-2).

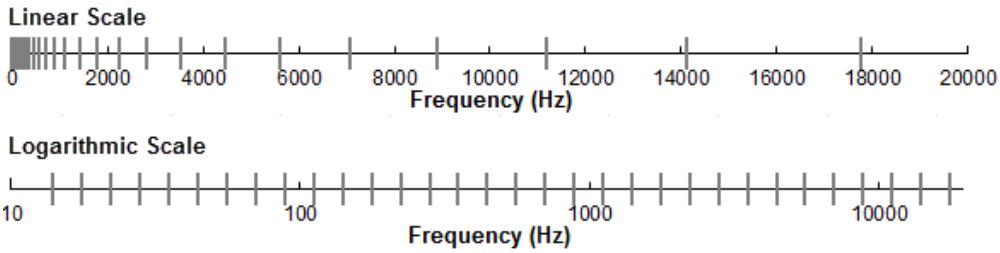


Figure B-2. Decidecade frequency bands (vertical lines) shown on a linear frequency scale and a logarithmic scale.

The sound pressure level in the ith band ($L_{p,i}$) is computed from the spectrum $S(f)$ between $f_{\mathrm{lo},i}$ and $f_{\mathrm{hi},i}$:

$$L_{p,i} = 10 \log_{10} \int_{f_{\mathrm{lo},i}}^{f_{\mathrm{hi},i}} S(f)\, df \tag{B-3}$$

Summing the sound pressure level of all the bands yields the broadband sound pressure level:

$$\text{Broadband SPL} = 10 \log_{10} \sum_{i} 10^{\frac{L_{p,i}}{10}} \tag{B-4}$$

Figure B-3 shows an example of how the decidecade band sound pressure levels compare to the sound pressure spectral density levels of an ambient noise signal. Because the decidecade bands are wider with increasing frequency, the decidecade band SPL is higher than the spectral levels at higher frequencies. Decidecade band analysis is applied to continuous and impulsive noise sources. For impulsive sources, the decidecade band SEL is typically reported.

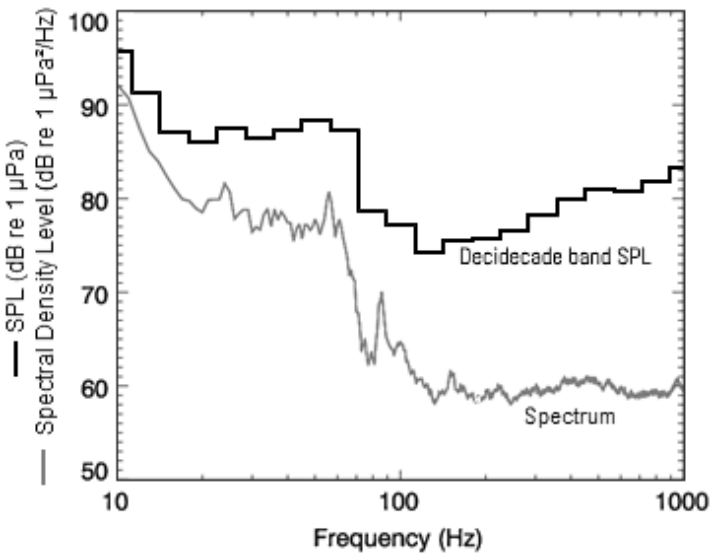


Figure B-3. Sound pressure spectral density levels and the corresponding decidecade band sound pressure levels of example ambient noise shown on a logarithmic frequency scale.

Table B-1. Decidecade band frequencies (Hz)

Band	Lower frequency	Nominal centre frequency	Upper frequency
10	8.9	10.0	11.2
11	11.2	12.6	14.1
12	14.1	15.8	17.8
13	17.8	20.0	22.4
14	22.4	25.1	28.2
15	28.2	31.6	35.5
16	35.5	39.8	44.7
17	44.7	50.1	56.2
18	56.2	63.1	70.8
19	70.8	79.4	89.1
20	89.1	100.0	112.2
21	112	126	141
22	141	158	178
23	178	200	224
24	224	251	282
25	282	316	355
26	355	398	447
27	447	501	562
28	562	631	708
29	708	794	891
30	891	1000	1122
31	1122	1259	1413
32	1413	1585	1778
33	1778	1995	2239
34	2239	2512	2818
35	2818	3162	3548
36	3548	3981	4467
37	4467	5012	5623
38	5623	6310	7079
39	7079	7943	8913
40	8913	10000	11220
41	11220	12589	14125
42	14260	16000	17952
43	17825	20000	22440
44	22281	25000	28050
45	28074	31500	35344

Table B-2. Decade-band frequencies (Hz)

Decade band	Lower frequency	Nominal centre frequency	Upper frequency
A	10	50	100
B	100	500	1,000
C	1,000	5,000	10,000

B.3. Millidecade Band Analysis

JASCO Applied Sciences has adopted a hybrid millidecade spectrum system to store and exchange passive acoustic spectral data to optimize data resolution while minimising data size, described in Martin et al. (2021).

Millidecades are logarithmically spaced frequency bands but have a bandwidth equal to 1/1000th of a decade. This frequency resolution is high enough to support many types of analysis, including analysing different types of soundscapes, computing weighted sound exposure levels, and summing the millidecades to find decidecades, 1/3-octave, and other desired frequency bands. The size of the millidecade files greatly compresses the acoustic data compared to 1 Hz resolution, such that data from long-term, multiple-station, high-sampling frequency projects can easily be stored at a single location. For example, there are 1,000 millidecades in each frequency decade, where a decade is an increase in the frequency by a factor of 10. A pure millidecade presentation of a spectrum from 1–100,000 Hz has 5,000 bands rather than 100,000 1 Hz bands, which results in a 20:1 decrease in the amount of data required for storage or exchange. For a 256 kHz spectrum, which is becoming a common size for recorders sampling at 512 kHz, there are 3,206 hybrid millidecades resulting in a compression ratio of 80:1.

The format uses 1-Hz resolution up to 455 Hz and millidecades frequency bands above 455 Hz. The lowest millidecades over-resolve (bin sizes <1 Hz) the space between 1–435 Hz for nearly all soundscape applications. To address this, a hybrid solution was applied that uses 1 Hz bands up to 455 Hz, where the millidecades are 1 Hz wide.

Similar to decidecades, the centre frequency for the ith millidecade (f_{c_i}) is defined as

$$f_{c\_i} = 10^{i/1{,}000}\ (\mathrm{Hz}) \tag{15}$$

and the lower (f_{lo_i}) and upper (f_{hi_i}) bounds for each millidecade are

$$f_{lo\_i} = f_{c\_i} \cdot 10^{-1/2{,}000}\ (\mathrm{Hz}) \tag{16}$$

$$f_{hi\_i} = f_{c\_i} \cdot 10^{1/2{,}000}\ (\mathrm{Hz})\ . \tag{17}$$

Appendix C. Recorder Calibration

The AMAR was calibrated before deployment with a pistonphone type 42AC precision sound source (G.R.A.S. Sound & Vibration A/S; Figure C-1). Due to the unforeseen delay of the retrieval the battery life was exhausted which prevented a calibration after retrieval. The pistonphone calibrator produces a constant tone at 250 Hz at a fixed distance from the hydrophone sensor in an airtight space with known volume. The recorded level of the reference tone on the AMAR yields the system gain for the AMAR and hydrophone. To determine absolute sound pressure levels, this gain was applied during data analysis. Typical calibration variance using this method is less than 0.7 dB absolute pressure.

Figure C-1. Split view of a G.R.A.S. 42AC pistonphone calibrator with an M36 hydrophone.

Appendix D. Marine Mammal Detection Methodology

D.1. Automated Click Detector for Odontocetes

We applied an automated click detector/classifier to the data to detect clicks from odontocetes (Figure D-1.). This detector/classifier is based on the zero-crossings in the acoustic time series. Zero-crossings are the rapid oscillations of a click's pressure waveform above and below the signal's normal level (e.g., Figure D-1.). Clicks are detected by the following steps (Figure D-1.):

1. The raw data is high-pass filtered to remove all energy below 5 kHz. This removes most energy from other sources such as shrimp, vessels, wind, and cetacean tonal calls, yet allows the energy from all marine mammal click types to pass.
2. The filtered samples are summed to create a 0.334 ms rms time series. Most marine mammal clicks have a 0.1–1 ms duration.
3. Possible click events are identified with a split-window normaliser that divides the 'test' bin of the time series by the mean of the 6 'window' bins on either side of the test bin, leaving a 1-bin wide 'notch'.
4. A Teager-Kaiser energy detector identifies possible click events.
5. The high-pass filtered data is searched to find the maximum peak signal within 1 ms of the detected peak.
6. The high-pass filtered data is searched backwards and forwards to find the time span where the local data maxima are within 9 dB of the maximum peak. The algorithm allows for two zero-crossings to occur where the local peak is not within 9 dB of the maximum before stopping the search. This defines the time window of the detected click.
7. The classification parameters are extracted. The number of zero crossings within the click, the median time separation between zero crossings, and the slope of the change in time separation between zero crossings are computed. The slope parameter helps to identify beaked whale clicks, as beaked whales can be identified by the increase in frequency (upsweep) of their clicks.
8. The Mahalanobis distance between the extracted classification parameters and the templates of known click types is computed. The covariance matrices for the known click types, computed from thousands of manually identified clicks for each species, are stored in an external file. Each click is classified as a type with the minimum Mahalanobis distance unless none of them are less than the specified distance threshold.

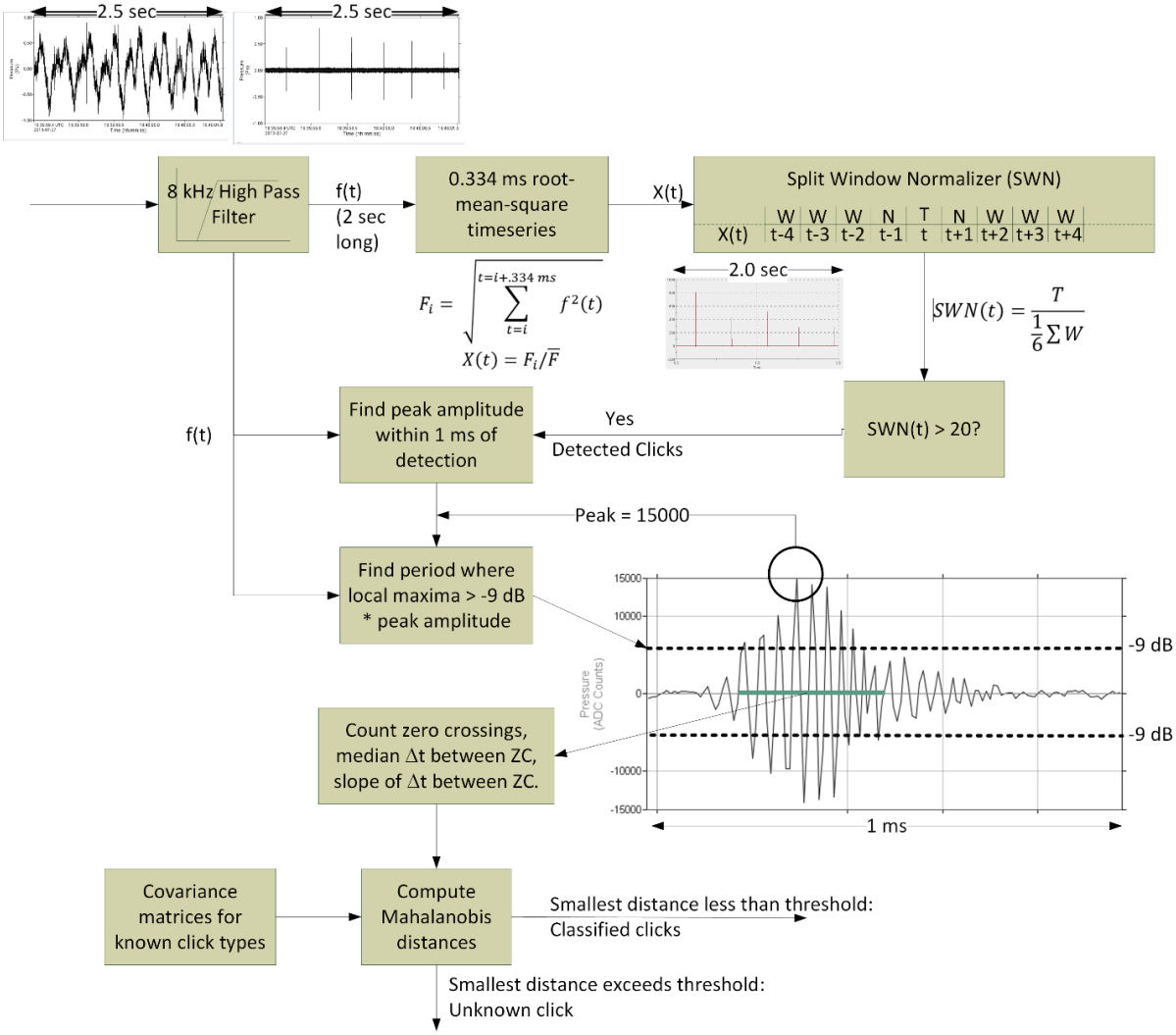


Figure D-1. The automated click detector/classifier block diagram.

Odontocete clicks occur in groups called click trains. Each species has a characteristic inter-click-interval (ICI) and number of clicks per train. The automated click detector includes a second stage that associates individual clicks into trains (Figure D-2). The steps of the click train associator algorithm are:

1. Queue clicks for N seconds, where N is twice the maximum number of clicks per train times the maximum ICI.
2. Search for all clicks within the window that have Mahalanobis distances less than 11 for the species of interest (this gets 99% of all clicks for the species as defined by the template).
3. Create a candidate click train if:
   a. The number of clicks is greater or equal to the minimum number of clicks in a train;
   b. The maximum time between any two clicks is less than twice the maximum ICI, and
   c. The smallest Mahalanobis distance for all clicks in the candidate train is less than 4.1.
4. Create a new 'time-series' that has a value of 1 at the time of arrival of each clicks and zeroes everywhere else.
5. Apply a Hann window to the timeseries then compute the cepstrum.
4. A click train is classified if a peak in the cepstrum with amplitude > 5 times the standard deviation of the cepstrum occurs at a quefrency between the minimum maximum ICI.
5. Queue clicks for N seconds

6. Search for all clicks within the window that have Mahalanobis distances less than 10 (equal to the extent of the variance in the training data set).
7. If the number of clicks is greater than or equal to 3 and dT is less than 2 * max ICI, make a new time-series at the 0.333 ms rate; where the value is 1 when the clicks occurred and 0 for all other time bins. Perform the following processing on this time series:
    a. Compute cepstrum
    b. ICI is the peak of the cepstrum with amplitude > 5 * stdev and searching for quefrency between minICI and maxICI.
    c. For each click related to the previous Ncepstrum, create a new time series and compute ICI; if we get a good match, extend the click train; find a mean ICI and variance.
8. If the click features, total clicks and mean ICI match the species, output a species_click_train detection.

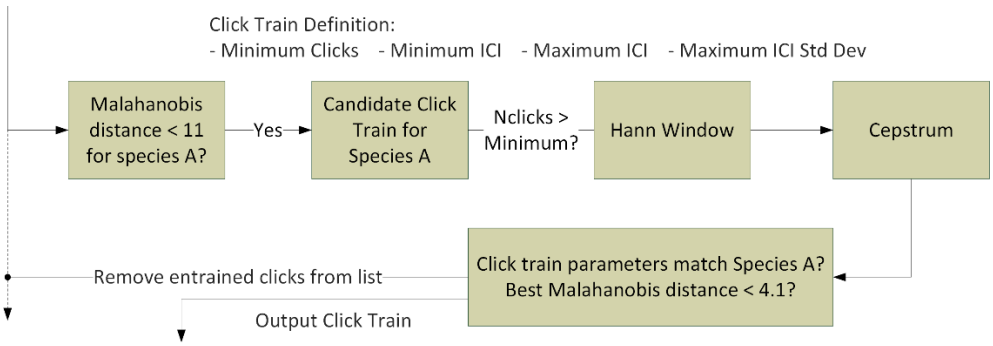


Figure D-2. The click train automated detector/classifier block diagram.

D.2. Automated Tonal Signal Detection

Marine mammal tonal acoustic signals are automatically detected by the following steps:

1. Spectrograms of the appropriate resolution for each mammal vocalisation type that were normalised by the median value in each frequency bin for each detection window Table D-1 were created.
2. Adjacent bins were joined, and contours were created via a contour-following algorithm (Figure D-3).
3. A sorting algorithm determined if the contours match the definition of a marine mammal vocalisation (Table D-2).

Due to the available time, a limited validation of the detections was performed by opening files with detections to check if actual calls were present.

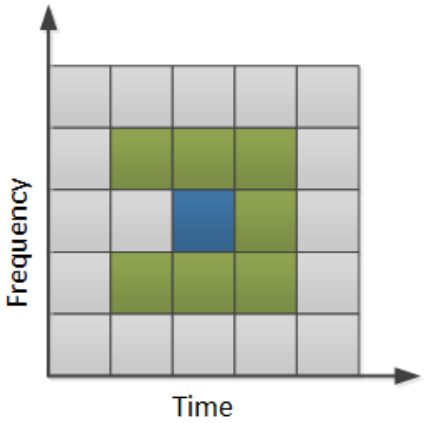


Figure D-3. Illustration of the search area used to connect spectrogram bins. The blue square represents a bin of the binary spectrogram equalling 1 and the green squares represent the potential bins it could be connected to. The algorithm advances from left to right so grey cells left of the test cell need not be checked.

Table D-1. Fast Fourier Transform (FFT) and detection window settings for all automated contour-based detectors used to detect tonal vocalisations of marine mammal species expected in the data. Values are based on JASCO's experience and empirical evaluation on a variety of data sets.

Automated detector	FFT			Detection window (s)	Detection threshold
	Resolution (Hz)	Frame length (s)	Timestep (s)		
AUS_BW_AH17	0.5	2	0.125	50	2
AUS_BW_AH60	0.5	2	0.125	50	2
AUS_BW_BH20	0.5	2	0.125	40	2
AUS_BW_BH43	0.5	2	0.125	40	2
AUS_BW_BH65	0.5	2	0.125	40	2
BW_H67	0.5	2	0.125	1200	3
BW_DS	0.05	2	0.2	5	3
NPac_BW_D	0.05	2	0.25	10	2
Brydes_DS	0.125	2	0.25	120	3
Brydes_IM_W	0.5	2	0.125	5	4
VLFMoan	2	0.2	0.05	15	4
LFMoan	2	0.25	0.05	10	3
ShortLow	7	0.17	0.025	10	3
MFMoanLow	4	0.2	0.05	5	3
MFMoanHigh	8	0.125	0.05	5	3
Omura_S1	0.25	2	0.25	120	6
Omura_S2	0.25	0.5	0.5	60	4
Omura_W	0.25	2	0.25	120	4
WhistleLow	16	0.03	0.015	5	3
WhistleHigh	64	0.015	0.005	5	3
MF Moan-LowDS-H:M	0.05	4	0.2	5	7
MF Moan-MidT-L	0.05	4	0.2	5	1.5
MF Moan-LowT-L	0.05	4	0.2	5	1.5
MF Moan-LowDS-L	0.05	4	0.2	5	3

Table D-2. A sample of vocalisation sorter definitions for the tonal vocalisations of cetacean species expected in the area.

Automated detector	Target species	Frequency (Hz)	Duration (s)	Bandwidth (B; Hz)	Other detection parameters
AUS_BW_AH17	Blue whale	10–100	6–60	1–50	Peak frequency 17–18.5
AUS_BW_AH60	Blue whale	10–100	6–60	1–50	Peak frequency 59–60.5
AUS_BW_BH20	Blue whale	10–100	6–30	1–3	Peak frequency 21–22.5
AUS_BW_BH43	Blue whale	10–100	6–30	1–3	Peak frequency 43–44.5
AUS_BW_BH65	Blue whale	10–100	6–30	1–3	Peak frequency 64–66.5
BW_H67	Blue whale	60–70	10–30	1–10	n/a
BW_DS	Blue whale	30–100	0.45–1	30–60	n/a
NPac_BW_D	Blue whale	20–100	2–10	15–50	Sweep rate −15 to −5
Brydes_DS	Bryde's whale	30–200	0.5–3	10–80	n/a
Brydes_IM_W	Bryde's whale	24–30	2–6	0.5–4	n/a
VLFMoan	Blue/fin/sei whale	10–100	0.30–10.00	>10	minF<40 Hz
LFMoan	Blue/right/sei whale	40–250	0.50–10.00	>15	InstantaneousBandwidth<50 Hz
ShortLow	Fin/baleen whale	30–400	0.08–0.60	>25	n/a
MFMoanLow	Humpback whale	100–700	0.50–5.00	>50	minF<450 Hz InstantaneousBandwidth<200 Hz
MFMoanHigh	Humpback whale	500–2500	0.50–5.00	>150	minF<1500 Hz InstantaneousBandwidth<300 Hz
Omura_S1	Omura's whale	15–60	5–12	8–40	n/a
Omura_S2	Omura's whale	10–60	3–15	8–40	n/a
Omura_W	Omura's whale	24–30	2–6	0.5–4	n/a
WhistleLow	Pilot/killer whale	1000–10000	0.50–5.00	>300	Max Instantaneous Bandwidth = 1000 Hz minF<5000 Hz
WhistleHigh	Other delphinid	4000–20000	0.30–3.00	>700	Max Instantaneous Bandwidth = 5000 Hz
MF Moan-LowDS-H:M	Humpback whale	100–1000	0.35–1.5	200–900	n/a
MF Moan-MidT-L	Humpback whale	500–1500	0.9–2.9	125–500	n/a
MF Moan-LowT-L	Humpback whale	50–950	0.9–2.9	50–500	n/a
MF Moan-LowDS-L	Humpback whale	100–1000	0.35–1.5	200–900	n/a

D.3. Automatic Data Selection for Validation (ADSV)

To standardise the file selection process for the selection of data for manual analysis, we applied our Automated Data Selection for Validation (ADSV) algorithm. Details of the ADSV algorithm are described in Kowarski et al. (2021) and a schematic of the process is provided in Figure D-4. ADSV computes the distribution of three descriptors that describe the automated detections in the full data set: the Diversity (number of automated detectors triggered per file), the Counts (number of automated detections per file for each automated detector), and the Temporal Distribution (spread of detections for each automated detector across the recording period). The algorithm removes files from the temporary data set that have the least impact on the distribution of the three descriptors in the full data set. Files are removed until a pre-determined data set size (*N*) is reached, at which point the temporary data set becomes the subset to be manually reviewed.

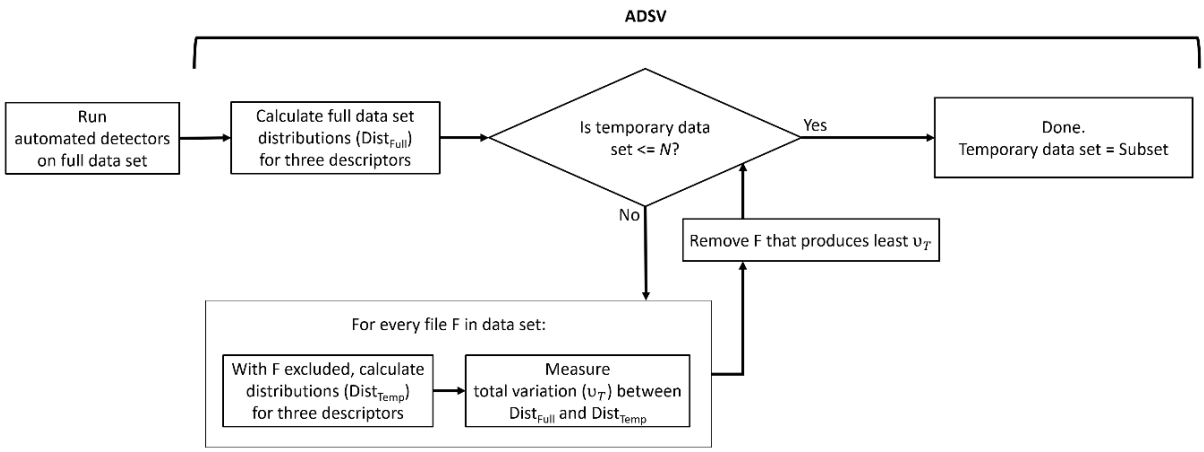


Figure D-4. Automated Data Selection for Validation (ADSV) process Figure 1 from Kowarski et al. (2021).

For the present work, an *N* of 0.5% was selected, largely due to limited scope for this project and marine mammal analysis. Even with limited manual review, the results presented here can be considered reliable, but some caveats should be considered. It is important to note that with such limited data manually reviewed, very rare species may have been missed or their occurrence underestimated. If the 0.5% subset of data manually analysed was not sufficiently large to capture the full range of acoustic environments in the full data set, the resulting automated detector performance metrics may be inaccurate and therefore should be taken as an estimate.

D.4. Automated Detector Performance Calculation and Optimization

All files selected for manual validation were reviewed by one of two experienced analysts using JASCO's PAMlab software to determine the presence or absence of every species, regardless of whether a species was automatically detected in the 5 min file. Although the automated detectors classify specific signals, we validated the presence/absence of species at the file level, not the detection level. Acoustic signals were only assigned to a species if the analyst was confident in their assessment. When unsure, analysts would consult one another, peer reviewed literature, and other experts in the field. If certainty could not be reached, the file of concern would be classified as possibly containing the species in question or containing an unknown acoustic signal. Next, the validated results were compared to the automated detector results in three phases to refine the results and ensure they accurately represent the occurrence of each species in the study area.

In phase 1, the human validated versus automated detector results were plotted as time series and critically reviewed to determine when and where automated detections should be excluded. Questionable detections that overlap with the detection period of other species were scrutinized. By restricting detections spatially and/or temporally where appropriate, we can maximize the reliability of the results. No temporal restrictions were necessary for our automated detector results.

In phase 2, the performance of the automated detectors was calculated and optimized for each species using a threshold, defined as the number of automated detections per file at and above which detections of species were considered valid.

To determine the performance of each automated detector and any necessary thresholds, the automated and validated results (excluding files where an analyst indicated uncertainty in species occurrence) were fed to a maximum likelihood estimation algorithm that maximizes the probability of detection and minimizes the number of false alarms using the Matthews Correlation Coefficient (MCC):

$$MCC = \frac{TPxTN - FPxFN}{\sqrt{(\mathrm{TP}+\mathrm{FP})(\mathrm{TP}+\mathrm{FN})(\mathrm{TN}+\mathrm{FP})(\mathrm{TN}+\mathrm{FN})}}$$

$$P = \frac{TP}{TP + FP}; R = \frac{TP}{TP + FN}$$

where *TP* (true positive) is the number of correctly detected files, *FP* (false positive) is the number of files that are false detections, and *FN* (false negatives) is the number of files with missed detections. No thresholds were necessary for our automated detector results.

In phase 3, detections were further restricted to include only those where *P* was greater than or equal to 0.75. When *P* was less than 0.75, only validated results were used to describe the acoustic occurrence of a species. All species in the present data set had automated detectors that performed sufficiently well. The occurrence of each species was plotted using JASCO's Ark software as time series showing presence/absence by hour over each day.

Appendix E. Auditory Frequency Weighting Functions

The potential for anthropogenic sounds to impact marine mammals is largely dependent on whether the sound occurs at frequencies that an animal can hear well, unless the sound pressure level is so high that it can cause physical tissue damage regardless of frequency. Auditory (frequency) weighting functions reflect an animal's ability to hear a sound (Nedwell and Turnpenny 1998, Nedwell et al. 2007). Houser et al (2017) provide an example illustrating the effect of applying a weighting function to a (hypothetical) sound (Figure E-1).

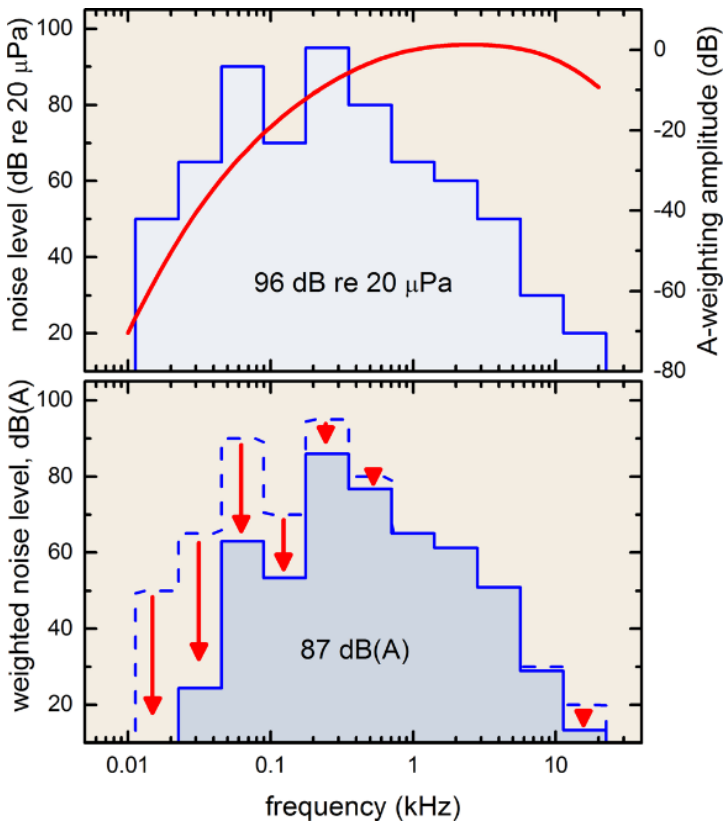


Figure E-1. Application of an auditory weighting function. Blue line shows a hypothetical, octave-band sound pressure spectrum in air, with a total sound pressure level (integrated over all octave-bands) of 96 dB re 20 μPa (This example uses in air-noise levels; therefore, a different reference pressure (20 μPa) applies. The principle is identical to underwater sound where a reference pressure of 1 μPa applies). (Top) Red line shows the human A-weighting function amplitude (A-weighting applies only to human hearing). (Bottom) To determine the weighted exposure level, the A-weighting amplitude at each frequency is added to the sound pressure level at each frequency (red arrows). The weighted spectrum has lower amplitude at the frequencies where the A-weighting function amplitudes are negative. The values from 1–4 kHz do not change substantially, because the weighting function is flat (i.e., the weights are near zero). The weighted SPL is calculated by integrating the weighted spectrum across all octave-bands; the result is 87 dBA, meaning a sound pressure level of 87 dB re 20 μPa after applying the human A-weighting function (Source: Houser et al. 2017).

To better reflect the auditory similarities between phylogenetically closely related species, but also significant differences between species groups among the marine mammals, the extant marine mammal species are assigned to functional hearing groups based on their hearing capabilities and sound production (NMFS 2018) (Table E-1). This division into broad categories is intended to provide a realistic number of categories for which individual noise exposure criteria were developed and the categorisation as such has proven to be a scientifically justified and useful approach in developing auditory frequency weighting functions and deriving noise exposure criteria for marine mammals.

Table E-1. Marine mammal hearing groups (NMFS 2018).

Hearing group	Generalised hearing range*
Low-frequency (LF) cetaceans (mysticetes or baleen whales)	7 Hz to 35 kHz
Mid-frequency (MF) cetaceans (odontocetes: delphinids, beaked whales)	150 Hz to 160 kHz
High-frequency (HF) cetaceans (other odontocetes)	275 Hz to 160 kHz
Phocid pinnipeds (PW) (underwater)	50 Hz to 86 kHz
Otariid pinnipeds (OW) (underwater)	60 Hz to 39 kHz

* The generalised hearing range for all species within a group. Individual hearing will vary.

The potential for noise to affect animals depends on how well the animals can hear it. Noises are less likely to disturb or injure an animal if they are at frequencies that the animal cannot hear well. An exception occurs when the sound pressure is so high that it can physically injure an animal by non-auditory means (i.e., barotrauma). For sound levels below such extremes, the importance of sound components at particular frequencies can be scaled by frequency weighting relevant to an animal's sensitivity to those frequencies (Nedwell and Turnpenny 1998, Nedwell et al. 2007).

In 2015, a U.S. Navy technical report by Finneran (2015) recommended new auditory weighting functions. The overall shape of the auditory weighting functions is similar to human A-weighting functions, which follows the sensitivity of the human ear at low sound levels. The new frequency-weighting function is expressed as:

$$G(f) = K + 10\log_{10}\left[\left(\frac{(f/f_{lo})^{2a}}{\left[1+(f/f_{lo})^{2}\right]^{a}\left[1+(f/f_{hi})^{2}\right]^{b}}\right)\right] \qquad \text{(E-1)}$$

Finneran (2015) proposed five functional hearing groups for marine mammals in water: low-, mid-, and high-frequency cetaceans, phocid pinnipeds, and otariid pinnipeds. The parameters for these frequency-weighting functions were further modified the following year (Finneran 2016) and were adopted in NOAA's technical guidance that assesses noise impacts on marine mammals (NMFS 2016, NMFS 2018). Table E-2 lists the frequency-weighting parameters for each hearing group; Figure E-2 shows the resulting frequency-weighting curves.

Table E-2. Parameters for the auditory weighting functions used in this project as recommended by NMFS (2018).

Hearing group	a	b	f_{lo} (Hz)	f_{hi} (kHz)	K (dB)
Low-frequency cetaceans (baleen whales)	1.0	2	200	19,000	0.13
Mid-frequency cetaceans (dolphins, plus toothed, beaked, and bottlenose whales)	1.6	2	8,800	110,000	1.20
High-frequency cetaceans (true porpoises, *Kogia*, river dolphins, cephalorhynchid, *Lagenorhynchus cruciger* and *L. australis*)	1.8	2	12,000	140,000	1.36
Phocid seals in water	1.0	2	1,900	30,000	0.75
Otariid seals in water	2.0	2	940	25,000	0.64

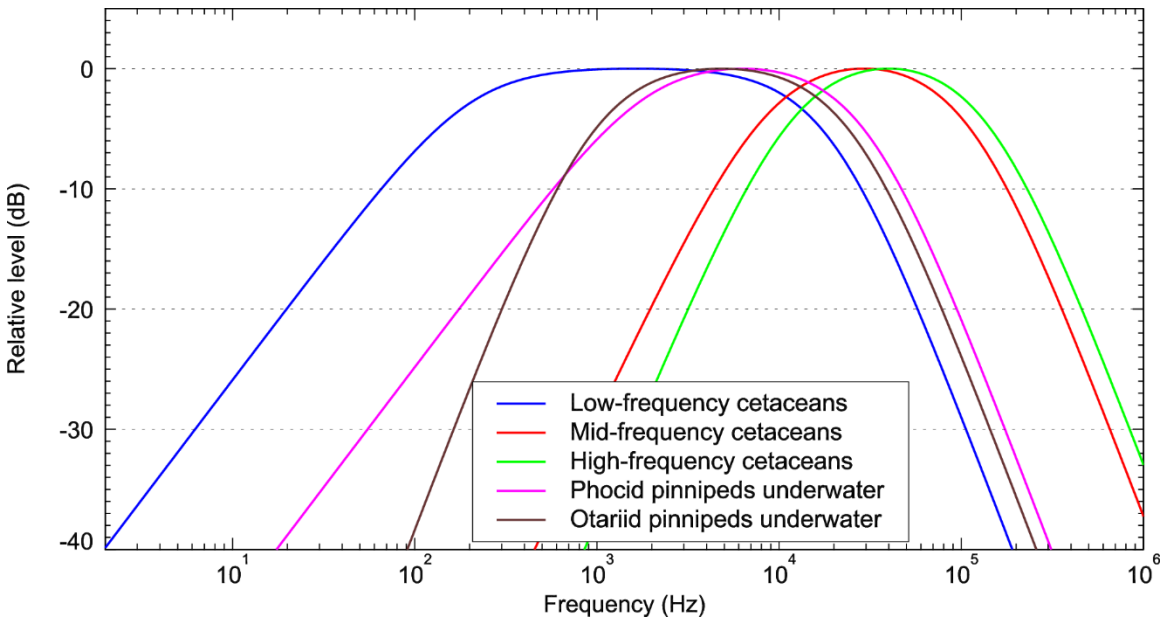


Figure E-2. Auditory weighting functions for functional marine mammal hearing groups as recommended by NMFS (2018).

Appendix F. Methods and Parameters

This section describes the specifications of the seismic source that was used at all sites and the environmental parameters used in the propagation models.

F.1. Estimating Range to Thresholds Levels

Sound level contours were calculated based on the underwater sound fields predicted by the propagation models, sampled by taking the maximum value over all modelled depths above the sea floor for each location in the modelled region. The predicted distances to specific levels were computed from these contours. Two distances relative to the source are reported for each sound level: 1) R_{max}, the maximum range to the given sound level over all azimuths, and 2) $R_{95\%}$, the range to the given sound level after the 5% farthest points were excluded (see examples in Figure F-1).

The $R_{95\%}$ is used because sound field footprints are often irregular in shape. In some cases, a sound level contour might have small protrusions or anomalous isolated fringes. This is demonstrated in the image in Figure F-1(a). In cases such as this, where relatively few points are excluded in any given direction, R_{max} can misrepresent the area of the region exposed to such effects, and $R_{95\%}$ is considered more representative. In strongly asymmetric cases such as shown in Figure F-1(b), on the other hand, $R_{95\%}$ neglects to account for significant protrusions in the footprint. In such cases R_{max} might better represent the region of effect in specific directions. Cases such as this are usually associated with bathymetric features affecting propagation. The difference between R_{max} and $R_{95\%}$ depends on the source directivity and the non-uniformity of the acoustic environment.

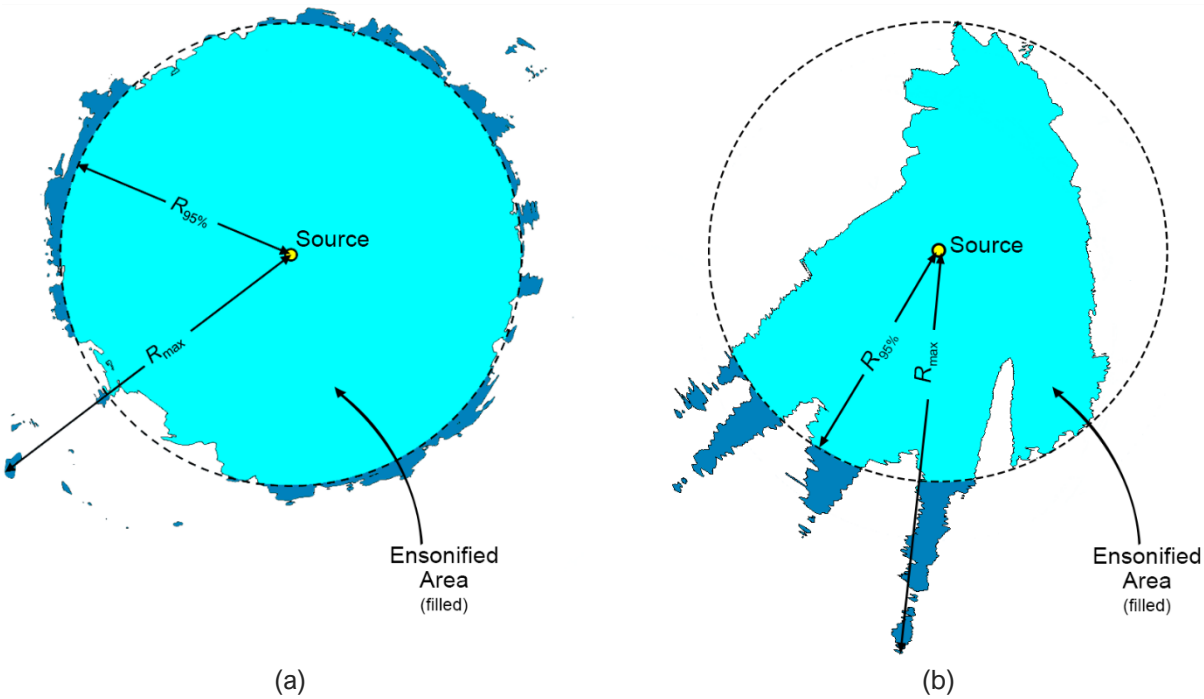


Figure F-1. Sample areas ensonified to an arbitrary sound level with R_{max} and $R_{95\%}$ ranges shown for two scenarios. (a) Largely symmetric sound level contour with small protrusions. (b) Strongly asymmetric sound level contour with long protrusions. Light blue indicates the ensonified areas bounded by $R_{95\%}$; darker blue indicates the areas outside this boundary which determine R_{max}.

F.2. Environmental Parameters

F.2.1. Bathymetry

Water depths throughout the modelled areas were extracted from the Australian Bathymetry and Topography Grid, a 9 arc-second grid rendered for Australian waters (Whiteway 2009). Bathymetry data were re-gridded onto a Map Grid of Australia (MGA) coordinate projection (Zone 54) with a regular grid spacing of 100 × 100 m.

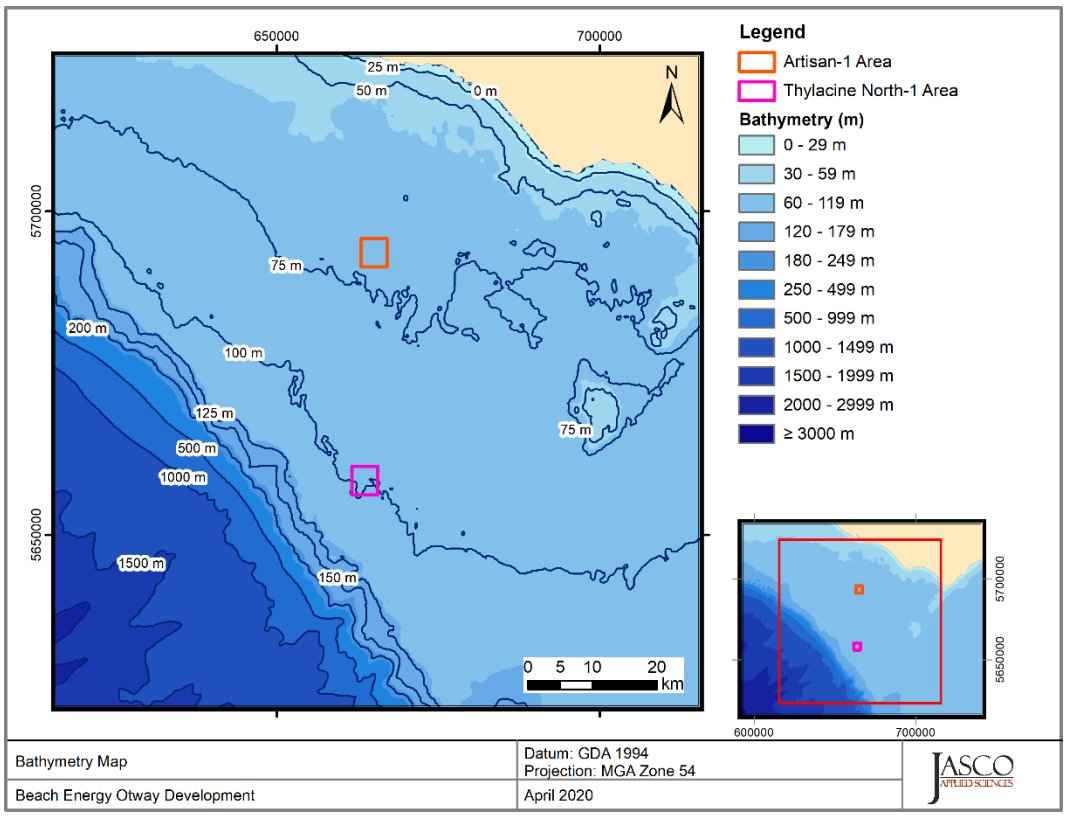


Figure F-2. Bathymetry in the modelled area.

F.2.2. Sound speed profile

Between 0–77 m water depth, mean daily sound speed profiles were derived from the Global Ice Ocean Prediction System (GIOPS) forecasting system for the period when the measurement data was acquired (February 2021 to March 2021 inclusive). A median profile determined to best represent potential propagation conditions over the periods. For deeper water depths below 77 m the sounds speed profile was combined with the sound speed profiles from GDEM (GDEM; Teague et al. 1990, Carnes 2009).

The GIOPS is a data assimilation system that combines satellite and in-situ measurements for ice and ocean analyses and forecasts. Available sea ice analysis products are generated from sea ice concentration data and other satellite measurements from the Canadian Ice Service. For oceanographic variables, GIOPS assimilates a variety of satellite and in-situ observations (Argos profiling floats, ice buoys, moorings, ship observations, and others) to provide a 3-d representation of ocean temperature and salinity, water velocity, sea surface height and mixed layer depth. Meant primarily as a forecasting tool, the daily reported results are not archived long term for general use, but JASCO started caching GIOPS output in 2017 to support Arctic programs.

GDEM provides an ocean climatology of temperature and salinity for the world's oceans on a latitude-longitude grid with 0.25° resolution, with a temporal resolution of one month, based on global historical observations from the U.S. Navy's Master Oceanographic Observational Data Set (MOODS). The climatology profiles include 78 fixed depth points to a maximum depth of 6800 m (where the ocean is that deep). The GDEM temperature-salinity profiles were converted to sound speed profiles according to Coppens (1981).

The February and March were selected for sound propagation modelling to ensure to align with the measurement period. Figure F-3 shows the resulting profile, which was used as input for the sound propagation modelling.

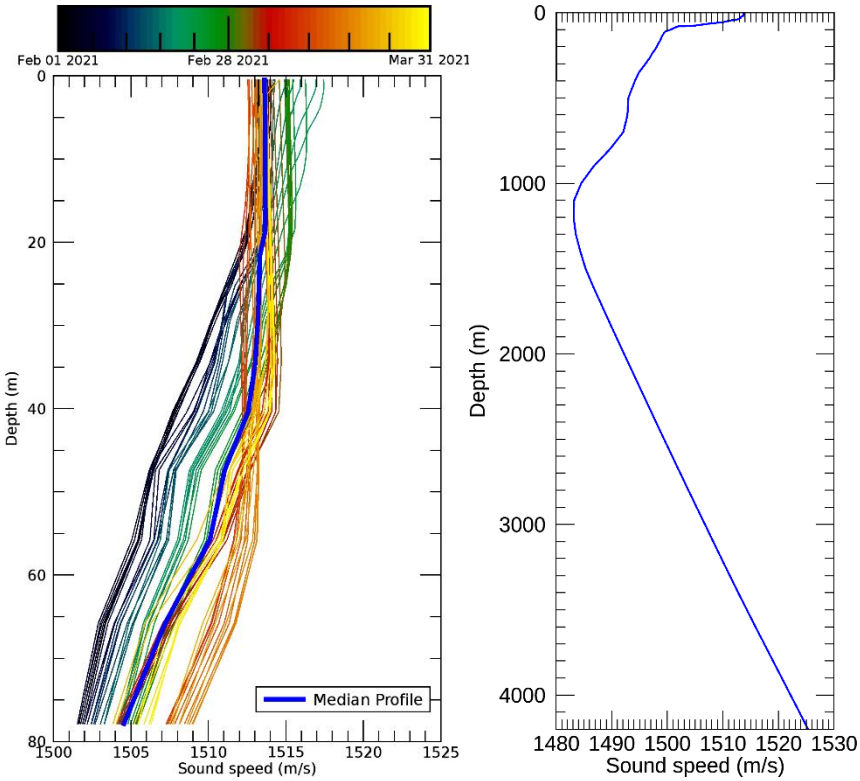


Figure F-3. The sound speed profile used for modelling: The daily and median profiles for the first 77 m from Global Ice Ocean Prediction System (GIOPS) (left) and full depth (right).

F.2.3. Geoacoustics

The propagation model used in this study consider a single geoacoustic profile for the modelled area. These profiles determine how sound is reflected from the seabed, as well as how it is transmitted, reflected, and absorbed into the sediment layers. The seabed in the Artisan-1, located in shallower waters, was characterised by cemented and semi-cemented carbonate rock (calcarenite). semi-cemented carbonate rock with the potential for a thin overlying veneer of coarse sand. This geologic model of the seabed environment is consistent with larger scale geological data and interpretations of the Australian continental shelf environment (James and Bone 2010). Tables F-1 and F-2 present the geoacoustic profiles used modelled sites for each seabed type considered.

Table F-1. *Artisan-1*: Carbonate rock geoacoustic profile. Each parameter varies linearly within the stated range.

Depth below seafloor (m)	Predicted lithology	Density (g/cm³)	Compressional wave		Shear wave	
			Speed (m/s)	Attenuation (dB/λ)	Speed (m/s)	Attenuation (dB/λ)
0–0.5	Well-cemented carbonate caprock	2.7	2600	0.50	500	0.4
0.5–20	Increasingly cemented calcarenite	2.2	2000	0.30		
20–40		2.3	2120	0.34		
40–60		2.4	2240	0.38		
60–80		2.5	2360	0.42		
80–100		2.6	2480	0.46		
>100	Well-cemented calcarenite	2.7	2600	0.5		

Table F-2. *Artisan-1*: Carbonate rock geoacoustic profile with overlying sand veneer. Each parameter varies linearly within the stated range.

Depth below seafloor (m)	Predicted lithology	Density (g/cm³)	Compressional wave		Shear wave	
			Speed (m/s)	Attenuation (dB/λ)	Speed (m/s)	Attenuation (dB/λ)
0–1	Coarse carbonate sand	2.03	1800	0.85	300	3.68
1–20	Increasingly cemented calcarenite	2.2	2000	0.30		
20–40		2.3	2120	0.34		
40–60		2.4	2240	0.38		
60–80		2.5	2360	0.42		
80–100		2.6	2480	0.46		
>100	Well-cemented calcarenite	2.7	2600	0.5		

Appendix G. ShipSound Reports

G.1. *Ocean Onyx* Reports

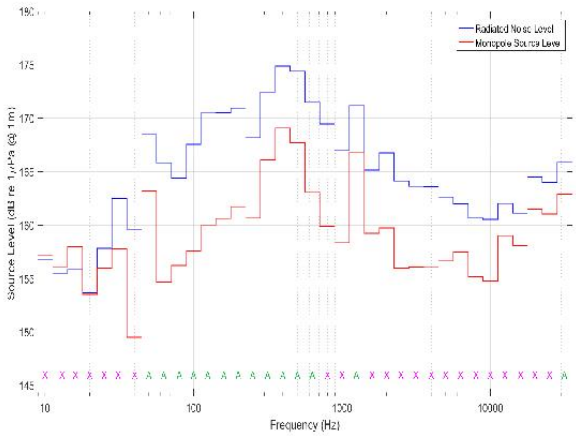
G.1.1. Report 1: 14:22 on 23 Feb 2021

Vessel Underwater Acoustic Source Level Measurement Report

This Vessel Underwater Acoustic Source Level Measurement Report is provided by JASCO Applied Sciences, for the limited purpose of understanding approximate underwater noise emission levels of vessels.[1]

Vessel Information	
MMSI:	538001765
IMO:	0
Name:	OCEAN ONYX
Flag:	Marshall Is
Vessel DWT (TEU):	102.0
PortListen Vessel Type	Other
Length (m):	106.35
Beam (m)	105.16
Maximum Draft (m):	N/A
Engine Power (kW):	N/A
Number of Shafts:	N/A
Prop Diameter (m):	N/A

Measurement Information	
Measurement Date (UTC):	February 23, 2021
Closest Approach Time (UTC):	14:22:04
Closest Approach Distance (m):	306.6
Vessel Ground Speed (kn):	0.0
Sail Direction over ground (deg):	326.0
Vessel Water Speed (kn):	N/A
Shaft rate (rpm):	-6000.0
Vessel Percent Power/Pitch:	N/A
Actual Vessel Draft max (m):	22.0
Monopole Source Depth (m):	11.0
Monopole Source Level (dB/µPa):	175.4
Radiated Noise Level (dB/µPa):	182.2



The 1/3-octave frequency band vessel source levels are presented in two metrics formats:

1. Radiated Noise Level - as defined in ANSI 12.64 - 2009 (R2014) measurement standard, and
2. Monopole Source Level - considers sound energy as originating from a point location, most suitable for use by acoustic models that independently account for surface and seabed reflections
3. Values marked "x" have less than 3 dB signal-to-noise ratio (SNR). Those marked with "A" are adjusted for SNR between 3 and 10 dB.

[1] With respect to the information provided in this report, neither JASCO Applied Sciences nor any of their respective directors, officers, employees, contractors or agents (collectively, the "Report Providers") make any warranty either expressed or implied, including the warranty for fitness for a particular purpose, nor assume any legal liability or responsibility for the accuracy, completeness, or usefulness of information disclosed. Furthermore, this report and the measurements reported herein cannot be used to confirm or counter any claim of adherence to or exceedance of legislated noise emission standards in any jurisdiction and by accepting this report, the report recipient agrees that the Report Providers shall not be liable for any losses, claims, damages, actions, fines, penalties, costs or expenses, including legal fees, arising from the use of this report for any purpose whatsoever.

Vessel Underwater Noise Rating - Additional Information

Underwater Noise from vessels has the potential to disturb marine mammals, fish and other marine fauna. JASCO wishes to assist the shipping industry reduce its noise footprint in the marine environment. With this goal in mind, we have developed a vessel noise measurement system and a comparative noise ranking method that allows vessel noise emissions to be characterized relative to those of other vessels of the same class and similar size. The acoustic measurement approach conforms approximately with the protocol defined in ANSI standard 12.64-2009 Grade C, with exceptions as outlined below.

Vessel underwater noise emissions vary with vessel class, size, tonnage, speed, loading and other parameters. The system implements frequency weighting that considers that different marine species have different hearing acuities. For example, humpback whales are believed to be more sensitive to low-frequency sounds than killer whales. To account for these differences, the system calculates frequency-weighted noise metrics based on functions adopted by U.S. National Oceanic and Atmospheric Administration (NOAA) and published in their Marine Mammal Acoustic Technical Guidance[2]. The listening station calculates frequency-weighted noise levels for: Low Frequency Cetaceans (LFC), Mid-Frequency Cetaceans (MFC), and High-Frequency Cetaceans (HFC), Phocid Pinnipeds (PPW) and Otariid Pinnipeds (OPW). The actual rating value is the percentile of the vessel's adjusted and frequency-weighted noise level relative to all vessels of the same class.

RNL with Marine Mammal Weightings (NOAA 2016):

Low Frequency Cetaceans (LFC):	180.4	LFC Rank:	N/A
Mid-Frequency Cetaceans (MFC):	165.9	MFC Rank:	N/A
High-Frequency Cetaceans (HFC):	165.8	HFC Rank:	N/A

Additional Information for this Vessel Measurement:

Name of Vessel:	OCEAN ONYX
Measurement ID:	BEACHOTWAY-stn1-2021-02-538001765202102231422
Date of Measurement:	February 23, 2021

Environmental Information:

Closest Point of Approach location (WGS 84):	-38°53'029"S, 142°52'056"E		
Hydrophone location (WGS-84):	-38°53'024"S, 142°53'008"E		
Water Depth (m):	70.0		
Hydrophone Depth (m):	68.5	Wind Speed (kn):	9.0
Speed of Current (kn):	N/A	Wind Direction (deg):	184.0
Current Direction (deg):	N/A	Sea State Code (WMO):	N/A

Conformance with Standard

The vessel source measurements reported here were acquired using procedures conforming approximately with Grade C - Survey Method - ANSI 12.64-2009 (R2014) Quantities and Procedures for Description and Measurement of Underwater Sound from Ships - Part 1: General Requirements. Notable conformance exceptions are:

1. The standard requires 4 vessel passes, while this measurement is of a single pass.
2. The standard requires vessel Closest Point of Approach (CPA) of the greater of 100 m or one vessel length. This system may admit measurements at other distances.
3. The standard requires the hydrophone subtend depression angles relative to the ship of 20° ± 5° below horizontal, while this system permits angles from 10° to 60°.

Vessel name and dimension information is obtained from Automatic Identification System (AIS) records sent from the vessel at time of measurement and from MarineTraffic.com. Fields not transmitted by these services are marked as N/A in the report. Frequency bands marked with "X" or "A" in the source level graphs are respectively invalid or adjusted, due to being insufficiently above background noise levels as described in the standard.

[2] Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0), NOAA Technical Memorandum NMFS-OPR-59 April 2018. https://www.fisheries.noaa.gov/webdam/download/75962998

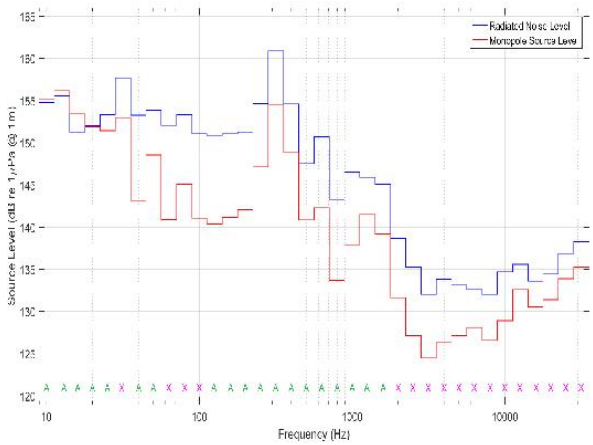
G.1.2. Report 2: 17:52 on 8 Mar 2021

Vessel Underwater Acoustic Source Level Measurement Report

This Vessel Underwater Acoustic Source Level Measurement Report is provided by JASCO Applied Sciences, for the limited purpose of understanding approximate underwater noise emission levels of vessels.[1]

Vessel Information	
MMSI:	538001765
IMO:	0
Name:	OCEAN ONYX
Flag:	Marshall Is
Vessel DWT (TEU):	102.0
PortListen Vessel Type	Other
Length (m):	106.35
Beam (m)	105.16
Maximum Draft (m):	N/A
Engine Power (kW):	N/A
Number of Shafts:	N/A
Prop Diameter (m):	N/A

Measurement Information	
Measurement Date (UTC):	March 08, 2021
Closest Approach Time (UTC):	17:52:04
Closest Approach Distance (m):	306.6
Vessel Ground Speed (kn):	0.0
Sail Direction over ground (deg):	326.0
Vessel Water Speed (kn):	N/A
Shaft rate (rpm):	-6000.0
Vessel Percent Power/Pitch:	N/A
Actual Vessel Draft max (m):	22.0
Monopole Source Depth (m):	11.0
Monopole Source Level (dB/µPa):	159.6
Radiated Noise Level (dB/µPa):	165.3



The 1/3-octave frequency band vessel source levels are presented in two metrics formats:

1. Radiated Noise Level - as defined in ANSI 12.64 - 2009 (R2014) measurement standard, and
2. Monopole Source Level - considers sound energy as originating from a point location, most suitable for use by acoustic models that independently account for surface and seabed reflections
3. Values marked "x" have less than 3 dB signal-to-noise ratio (SNR). Those marked with "A" are adjusted for SNR between 3 and 10 dB.

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Vessel Underwater Noise Rating - Additional Information

Underwater Noise from vessels has the potential to disturb marine mammals, fish and other marine fauna. JASCO wishes to assist the shipping industry reduce its noise footprint in the marine environment. With this goal in mind, we have developed a vessel noise measurement system and a comparative noise ranking method that allows vessel noise emissions to be characterized relative to those of other vessels of the same class and similar size. The acoustic measurement approach conforms approximately with the protocol defined in ANSI standard 12.64-2009 Grade C, with exceptions as outlined below.

Vessel underwater noise emissions vary with vessel class, size, tonnage, speed, loading and other parameters. The system implements frequency weighting that considers that different marine species have different hearing acuities. For example, humpback whales are believed to be more sensitive to low-frequency sounds than killer whales. To account for these differences, the system calculates frequency-weighted noise metrics based on functions adopted by U.S. National Oceanic and Atmospheric Administration (NOAA) and published in their Marine Mammal Acoustic Technical Guidance[2]. The listening station calculates frequency-weighted noise levels for: Low Frequency Cetaceans (LFC), Mid-Frequency Cetaceans (MFC), and High-Frequency Cetaceans (HFC), Phocid Pinnipeds (PPW) and Otariid Pinnipeds (OPW). The actual rating value is the percentile of the vessel's adjusted and frequency-weighted noise level relative to all vessels of the same class.

RNL with Marine Mammal Weightings (NOAA 2016):

Low Frequency Cetaceans (LFC):	162.6	LFC Rank:	N/A
Mid-Frequency Cetaceans (MFC):	126.5	MFC Rank:	N/A
High-Frequency Cetaceans (HFC):	118.2	HFC Rank:	N/A

Additional Information for this Vessel Measurement:

Name of Vessel:	OCEAN ONYX
Measurement ID:	BEACHOTWAY-stn1-2021-02-538001765202103081752
Date of Measurement:	March 08, 2021

Environmental Information:

Closest Point of Approach location (WGS 84):	-38°53'029"S, 142°52'056"E		
Hydrophone location (WGS-84):	-38°53'024"S, 142°53'008"E		
Water Depth (m):	70.0		
Hydrophone Depth (m):	68.5	Wind Speed (kn):	9.0
Speed of Current (kn):	N/A	Wind Direction (deg):	231.0
Current Direction (deg):	N/A	Sea State Code (WMO):	N/A

Conformance with Standard

The vessel source measurements reported here were acquired using procedures conforming approximately with Grade C - Survey Method - ANSI 12.64-2009 (R2014) Quantities and Procedures for Description and Measurement of Underwater Sound from Ships - Part 1: General Requirements. Notable conformance exceptions are:

1. The standard requires 4 vessel passes, while this measurement is of a single pass.
2. The standard requires vessel Closest Point of Approach (CPA) of the greater of 100 m or one vessel length. This system may admit measurements at other distances.
3. The standard requires the hydrophone subtend depression angles relative to the ship of 20° ± 5° below horizontal, while this system permits angles from 10° to 60°.

Vessel name and dimension information is obtained from Automatic Identification System (AIS) records sent from the vessel at time of measurement and from MarineTraffic.com. Fields not transmitted by these services are marked as N/A in the report. Frequency bands marked with "X" or "A" in the source level graphs are respectively invalid or adjusted, due to being insufficiently above background noise levels as described in the standard.

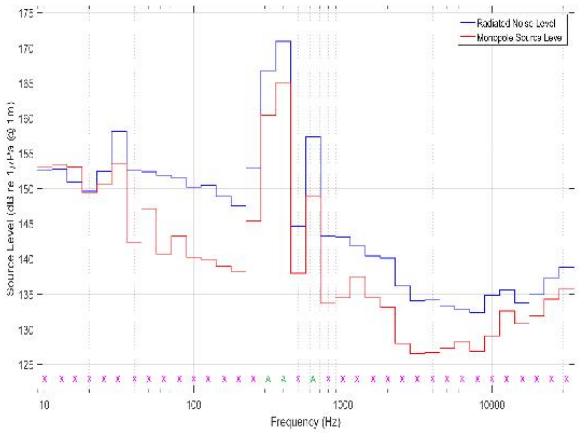
[2] Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0), NOAA Technical Memorandum NMFS-OPR-59 April 2018. https://www.fisheries.noaa.gov/webdam/download/75962998

G.1.3. Report 3: 18:22 on 8 Mar 2021

Vessel Underwater Acoustic Source Level Measurement Report

This Vessel Underwater Acoustic Source Level Measurement Report is provided by JASCO Applied Sciences, for the limited purpose of understanding approximate underwater noise emission levels of vessels.[1]

Vessel Information		Measurement Information	
MMSI:	538001765	Measurement Date (UTC):	March 08, 2021
IMO:	0	Closest Approach Time (UTC):	18:22:05
Name:	OCEAN ONYX	Closest Approach Distance (m):	306.6
Flag:	Marshall Is	Vessel Ground Speed (kn):	0.0
Vessel DWT (TEU):	102.0	Sail Direction over ground (deg):	326.0
PortListen Vessel Type	Other	Vessel Water Speed (kn):	N/A
Length (m):	106.35	Shaft rate (rpm):	-6000.0
Beam (m)	105.16	Vessel Percent Power/Pitch:	N/A
Maximum Draft (m):	N/A	Actual Vessel Draft max (m):	22.0
Engine Power (kW):	N/A	Monopole Source Depth (m):	11.0
Number of Shafts:	N/A	Monopole Source Level (dB/µPa):	166.5
Prop Diameter (m):	N/A	Radiated Noise Level (dB/µPa):	172.5



The 1/3-octave frequency band vessel source levels are presented in two metrics formats:

1. Radiated Noise Level - as defined in ANSI 12.64 - 2009 (R2014) measurement standard, and
2. Monopole Source Level - considers sound energy as originating from a point location, most suitable for use by acoustic models that independently account for surface and seabed reflections
3. Values marked "x" have less than 3 dB signal-to-noise ratio (SNR). Those marked with "A" are adjusted for SNR between 3 and 10 dB.

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Vessel Underwater Noise Rating - Additional Information

Underwater Noise from vessels has the potential to disturb marine mammals, fish and other marine fauna. JASCO wishes to assist the shipping industry reduce its noise footprint in the marine environment. With this goal in mind, we have developed a vessel noise measurement system and a comparative noise ranking method that allows vessel noise emissions to be characterized relative to those of other vessels of the same class and similar size. The acoustic measurement approach conforms approximately with the protocol defined in ANSI standard 12.64-2009 Grade C, with exceptions as outlined below.

Vessel underwater noise emissions vary with vessel class, size, tonnage, speed, loading and other parameters. The system implements frequency weighting that considers that different marine species have different hearing acuities. For example, humpback whales are believed to be more sensitive to low-frequency sounds than killer whales. To account for these differences, the system calculates frequency-weighted noise metrics based on functions adopted by U.S. National Oceanic and Atmospheric Administration (NOAA) and published in their Marine Mammal Acoustic Technical Guidance[2]. The listening station calculates frequency-weighted noise levels for: Low Frequency Cetaceans (LFC), Mid-Frequency Cetaceans (MFC), and High-Frequency Cetaceans (HFC), Phocid Pinnipeds (PPW) and Otariid Pinnipeds (OPW). The actual rating value is the percentile of the vessel's adjusted and frequency-weighted noise level relative to all vessels of the same class.

RNL with Marine Mammal Weightings (NOAA 2016):

Low Frequency Cetaceans (LFC):	171.5	LFC Rank:	N/A
Mid-Frequency Cetaceans (MFC):	130.5	MFC Rank:	N/A
High-Frequency Cetaceans (HFC):	120.5	HFC Rank:	N/A

Additional Information for this Vessel Measurement:

Name of Vessel:	OCEAN ONYX
Measurement ID:	BEACHOTWAY-stn1-2021-02-5380017652021030818 22
Date of Measurement:	March 08, 2021

Environmental Information:

Closest Point of Approach location (WGS 84):	-38°53'029"S, 142°52'056"E		
Hydrophone location (WGS-84):	-38°53'024"S, 142°53'008"E		
Water Depth (m):	70.0		
Hydrophone Depth (m):	68.5	Wind Speed (kn):	9.0
Speed of Current (kn):	N/A	Wind Direction (deg):	231.0
Current Direction (deg):	N/A	Sea State Code (WMO):	N/A

Conformance with Standard

The vessel source measurements reported here were acquired using procedures conforming approximately with Grade C - Survey Method - ANSI 12.64-2009 (R2014) Quantities and Procedures for Description and Measurement of Underwater Sound from Ships - Part 1: General Requirements. Notable conformance exceptions are:

1. The standard requires 4 vessel passes, while this measurement is of a single pass.
2. The standard requires vessel Closest Point of Approach (CPA) of the greater of 100 m or one vessel length. This system may admit measurements at other distances.
3. The standard requires the hydrophone subtend depression angles relative to the ship of 20° ± 5° below horizontal, while this system permits angles from 10° to 60°.

Vessel name and dimension information is obtained from Automatic Identification System (AIS) records sent from the vessel at time of measurement and from MarineTraffic.com. Fields not transmitted by these services are marked as N/A in the report. Frequency bands marked with "X" or "A" in the source level graphs are respectively invalid or adjusted, due to being insufficiently above background noise levels as described in the standard.

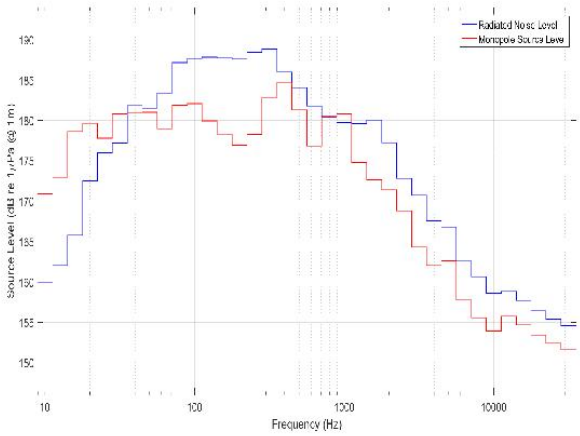
[2] Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0), NOAA Technical Memorandum NMFS-OPR-59 April 2018. https://www.fisheries.noaa.gov/webdam/download/75962998

G.2. Vessel DP Trial Report: 01:48 on 4 Feb 2021

Vessel Underwater Acoustic Source Level Measurement Report

This Vessel Underwater Acoustic Source Level Measurement Report is provided by JASCO Applied Sciences, for the limited purpose of understanding approximate underwater noise emission levels of vessels.[1]

Vessel Information		Measurement Information	
MMSI:	257544000	Measurement Date (UTC):	February 04, 2021
IMO:	0	Closest Approach Time (UTC):	1:48:00
Name:	SIEM SAPPHIRE	Closest Approach Distance (m):	182.6
Flag:	Norway	Vessel Ground Speed (kn):	0.6
Vessel DWT (TEU):	4250.0	Sail Direction over ground (deg):	152.4
PortListen Vessel Type	Other	Vessel Water Speed (kn):	N/A
Length (m):	91.0	Shaft rate (rpm):	-6000.0
Beam (m)	22.04	Vessel Percent Power/Pitch:	N/A
Maximum Draft (m):	N/A	Actual Vessel Draft max (m):	7.0
Engine Power (kW):	N/A	Monopole Source Depth (m):	4.9
Number of Shafts:	N/A	Monopole Source Level (dB/µPa):	193.4
Prop Diameter (m):	N/A	Radiated Noise Level (dB/µPa):	198.0



The 1/3-octave frequency band vessel source levels are presented in two metrics formats:

1. Radiated Noise Level - as defined in ANSI 12.64 - 2009 (R2014) measurement standard, and
2. Monopole Source Level - considers sound energy as originating from a point location, most suitable for use by acoustic models that independently account for surface and seabed reflections
3. Values marked "x" have less than 3 dB signal-to-noise ratio (SNR). Those marked with "A" are adjusted for SNR between 3 and 10 dB.

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Vessel Underwater Noise Rating - Additional Information

Underwater Noise from vessels has the potential to disturb marine mammals, fish and other marine fauna. JASCO wishes to assist the shipping industry reduce its noise footprint in the marine environment. With this goal in mind, we have developed a vessel noise measurement system and a comparative noise ranking method that allows vessel noise emissions to be characterized relative to those of other vessels of the same class and similar size. The acoustic measurement approach conforms approximately with the protocol defined in ANSI standard 12.64-2009 Grade C, with exceptions as outlined below.

Vessel underwater noise emissions vary with vessel class, size, tonnage, speed, loading and other parameters. The system implements frequency weighting that considers that different marine species have different hearing acuities. For example, humpback whales are believed to be more sensitive to low-frequency sounds than killer whales. To account for these differences, the system calculates frequency-weighted noise metrics based on functions adopted by U.S. National Oceanic and Atmospheric Administration (NOAA) and published in their Marine Mammal Acoustic Technical Guidance[2]. The listening station calculates frequency-weighted noise levels for: Low Frequency Cetaceans (LFC), Mid-Frequency Cetaceans (MFC), and High-Frequency Cetaceans (HFC), Phocid Pinnipeds (PPW) and Otariid Pinnipeds (OPW). The actual rating value is the percentile of the vessel's adjusted and frequency-weighted noise level relative to all vessels of the same class.

RNL with Marine Mammal Weightings (NOAA 2016):

Low Frequency Cetaceans (LFC):	195.0	LFC Rank:	N/A
Mid-Frequency Cetaceans (MFC):	168.4	MFC Rank:	N/A
High-Frequency Cetaceans (HFC):	164.7	HFC Rank:	N/A

Additional Information for this Vessel Measurement:

Name of Vessel:	SIEM SAPPHIRE
Measurement ID:	BEACHOTWAY-stn2-2021-02-257544000202102040148
Date of Measurement:	February 04, 2021

Environmental Information:

Closest Point of Approach location (WGS 84):	-38°53'010"S, 142°53'044"E		
Hydrophone location (WGS-84):	-38°53'011"S, 142°53'036"E		
Water Depth (m):	70.0		
Hydrophone Depth (m):	68.5	Wind Speed (kn):	13.0
Speed of Current (kn):	N/A	Wind Direction (deg):	89.0
Current Direction (deg):	N/A	Sea State Code (WMO):	N/A

Conformance with Standard

The vessel source measurements reported here were acquired using procedures conforming approximately with Grade C - Survey Method - ANSI 12.64-2009 (R2014) Quantities and Procedures for Description and Measurement of Underwater Sound from Ships - Part 1: General Requirements. Notable conformance exceptions are:

1. The standard requires 4 vessel passes, while this measurement is of a single pass.
2. The standard requires vessel Closest Point of Approach (CPA) of the greater of 100 m or one vessel length. This system may admit measurements at other distances.
3. The standard requires the hydrophone subtend depression angles relative to the ship of 20° ± 5° below horizontal, while this system permits angles from 10° to 60°.

Vessel name and dimension information is obtained from Automatic Identification System (AIS) records sent from the vessel at time of measurement and from MarineTraffic.com. Fields not transmitted by these services are marked as N/A in the report. Frequency bands marked with "X" or "A" in the source level graphs are respectively invalid or adjusted, due to being insufficiently above background noise levels as described in the standard.

[2] Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0), NOAA Technical Memorandum NMFS-OPR-59 April 2018. https://www.fisheries.noaa.gov/webdam/download/75962998

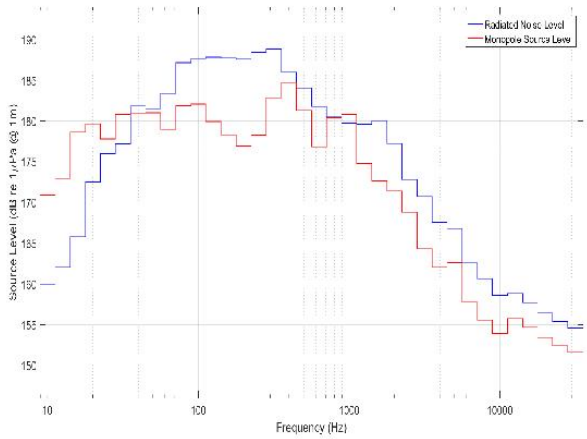
G.3. Vessel Transit Report: 21:56 on 10 Mar 2021

Vessel Underwater Acoustic Source Level Measurement Report

This Vessel Underwater Acoustic Source Level Measurement Report is provided by JASCO Applied Sciences, for the limited purpose of understanding approximate underwater noise emission levels of vessels.[1]

Vessel Information	
MMSI:	257544000
IMO:	0
Name:	SIEM SAPPHIRE
Flag:	Norway
Vessel DWT (TEU):	4250.0
PortListen Vessel Type	Other
Length (m):	91.0
Beam (m)	22.04
Maximum Draft (m):	N/A
Engine Power (kW):	N/A
Number of Shafts:	N/A
Prop Diameter (m):	N/A

Measurement Information	
Measurement Date (UTC):	February 04, 2021
Closest Approach Time (UTC):	1:48:00
Closest Approach Distance (m):	182.6
Vessel Ground Speed (kn):	0.6
Sail Direction over ground (deg):	152.4
Vessel Water Speed (kn):	N/A
Shaft rate (rpm):	-6000.0
Vessel Percent Power/Pitch:	N/A
Actual Vessel Draft max (m):	7.0
Monopole Source Depth (m):	4.9
Monopole Source Level (dB/µPa):	193.4
Radiated Noise Level (dB/µPa):	198.0



The 1/3-octave frequency band vessel source levels are presented in two metrics formats:

1. Radiated Noise Level - as defined in ANSI 12.64 - 2009 (R2014) measurement standard, and
2. Monopole Source Level - considers sound energy as originating from a point location, most suitable for use by acoustic models that independently account for surface and seabed reflections
3. Values marked "x" have less than 3 dB signal-to-noise ratio (SNR). Those marked with "A" are adjusted for SNR between 3 and 10 dB.

[1] With respect to the information provided in this report, neither JASCO Applied Sciences nor any of their respective directors, officers, employees, contractors or agents (collectively, the "Report Providers") make any warranty either expressed or implied, including the warranty for fitness for a particular purpose, nor assume any legal liability or responsibility for the accuracy, completeness, or usefulness of information disclosed. Furthermore, this report and the measurements reported herein cannot be used to confirm or counter any claim of adherence to or exceedance of legislated noise emission standards in any jurisdiction and by accepting this report, the report recipient agrees that the Report Providers shall not be liable for any losses, claims, damages, actions, fines, penalties, costs or expenses, including legal fees, arising from the use of this report for any purpose whatsoever.

Vessel Underwater Noise Rating - Additional Information

Underwater Noise from vessels has the potential to disturb marine mammals, fish and other marine fauna. JASCO wishes to assist the shipping industry reduce its noise footprint in the marine environment. With this goal in mind, we have developed a vessel noise measurement system and a comparative noise ranking method that allows vessel noise emissions to be characterized relative to those of other vessels of the same class and similar size. The acoustic measurement approach conforms approximately with the protocol defined in ANSI standard 12.64-2009 Grade C, with exceptions as outlined below.

Vessel underwater noise emissions vary with vessel class, size, tonnage, speed, loading and other parameters. The system implements frequency weighting that considers that different marine species have different hearing acuities. For example, humpback whales are believed to be more sensitive to low-frequency sounds than killer whales. To account for these differences, the system calculates frequency-weighted noise metrics based on functions adopted by U.S. National Oceanic and Atmospheric Administration (NOAA) and published in their Marine Mammal Acoustic Technical Guidance[2]. The listening station calculates frequency-weighted noise levels for: Low Frequency Cetaceans (LFC), Mid-Frequency Cetaceans (MFC), and High-Frequency Cetaceans (HFC), Phocid Pinnipeds (PPW) and Otariid Pinnipeds (OPW). The actual rating value is the percentile of the vessel's adjusted and frequency-weighted noise level relative to all vessels of the same class.

RNL with Marine Mammal Weightings (NOAA 2016):

Low Frequency Cetaceans (LFC):	195.0	LFC Rank:	N/A
Mid-Frequency Cetaceans (MFC):	168.4	MFC Rank:	N/A
High-Frequency Cetaceans (HFC):	164.7	HFC Rank:	N/A

Additional Information for this Vessel Measurement:

Name of Vessel:	SIEM SAPPHIRE
Measurement ID:	BEACHOTWAY-stn2-2021-02-257544000202102040148
Date of Measurement:	February 04, 2021

Environmental Information:

Closest Point of Approach location (WGS 84):	-38°53'010"S, 142°53'044"E		
Hydrophone location (WGS-84):	-38°53'011"S, 142°53'036"E		
Water Depth (m):	70.0		
Hydrophone Depth (m):	68.5	Wind Speed (kn):	13.0
Speed of Current (kn):	N/A	Wind Direction (deg):	89.0
Current Direction (deg):	N/A	Sea State Code (WMO):	N/A

Conformance with Standard

The vessel source measurements reported here were acquired using procedures conforming approximately with Grade C - Survey Method - ANSI 12.64-2009 (R2014) Quantities and Procedures for Description and Measurement of Underwater Sound from Ships - Part 1: General Requirements. Notable conformance exceptions are:

1. The standard requires 4 vessel passes, while this measurement is of a single pass.
2. The standard requires vessel Closest Point of Approach (CPA) of the greater of 100 m or one vessel length. This system may admit measurements at other distances.
3. The standard requires the hydrophone subtend depression angles relative to the ship of 20° ± 5° below horizontal, while this system permits angles from 10° to 60°.

Vessel name and dimension information is obtained from Automatic Identification System (AIS) records sent from the vessel at time of measurement and from MarineTraffic.com. Fields not transmitted by these services are marked as N/A in the report. Frequency bands marked with "X" or "A" in the source level graphs are respectively invalid or adjusted, due to being insufficiently above background noise levels as described in the standard.

[2] Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0), NOAA Technical Memorandum NMFS-OPR-59 April 2018. https://www.fisheries.noaa.gov/webdam/download/75962998

G. 2. Beach Otway Project: Additional and Revised Modelling Study (Koessler and McPherson 2021)

G. 3. Beach Otway Project, Additional Modelling at Well Location South (Connell and Koessler 2023)

G. 4. Beach Otway Development Acoustic Monitoring: Characterisation, Validation, and Marine Mammals McPherson et al. 2021)

Appendix H Whale Management Procedure

Offshore Gas Victoria (OGV) Drilling Program
Whale Management Procedure

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Revision History

Revision	Date	Notes	Author	Reviewer	Approver
Rev 3	28/01/2021	Updated Otway Drilling RFFWI 3	SJ	MS	PW
Rev 4a	06/02/2024	Updated for OGV Drilling Program	PW	MLH	BM

1. Purpose and Scope

This Whale Management Procedure (Procedure) details how Beach Energy (Operations) Limited (Beach) will avoid and minimise anthropogenic noise to whales undertaking biologically important behaviours during the Offshore Gas Victoria (OGV) Drilling Program.

This Procedure applies to whales undertaking biologically important behaviours, with a focus on **blue whales** and **southern right whales** as these species have Conservation Management Plans (CMP) under the Environment Protection and Biodiversity Conservation Act (1999) and Beach cannot undertake an activity that is inconsistent with these plans.

The activity is proposed to be undertaken in a pygmy blue whale Foraging Area (Annual high use area) and known foraging area as defined under the CMP.

The activity is also proposed to be undertaken in a southern right whale migration area.

In addition, during consultation, Beach identified that additional species of concern should be protected even though they are not currently covered by a CMP. These are **fin, pygmy right** and **sei whales**. This Procedure also applies to these species of concern.

This Procedure will ensure that the Environmental Performance Outcomes (EPOs) from the OGV Drilling Program Environment Plan (Drilling Program EP) relevant to whales will be achieved such that:

- EPO2: No death or injury to listed threatened or migratory species from the activity.
- EPO3: Biologically important behaviours can continue while the activity is being undertaken.
- EPO4: Anthropogenic noise in biologically important areas will be managed such that:
    - Any blue whale continues to utilise the area without injury, and is not displaced from a foraging area.
    - It does not prevent any southern right whale from utilising the area or cause injury (TTS and PTS) and/or disturbance.

This Procedure provides the details of the control measures required by Section 21(5)(c) of the OPGGS Environment Regulations and sets out the Environmental Performance Objectives (EPOs), Environmental Performance Standards (EPSs) and measurement criteria relevant to underwater sound impacts to whales from the OGV Drilling Program (OPGGS Environment Regulations Section 21(7)).

All vessels and helicopters must comply with the separation distances to whales as detailed in the EPBC Regulations 2000 – Part 8 Division 8.1 interacting with cetaceans (see Section 8 below).

2. Assumptions

Several assumptions have been made in creating this Procedure as noise mitigation measures from drilling activities have only recently been required offshore Australia, with Beach's Artisan-1 Exploration Well Drilling Environment Plan being one of the first to require these controls when it was accepted by NOPSEMA on 12 January 2021.

The Whale Management Plan developed for the Artisan-1 campaign has been further refined based on engagement with MMOs, blue whale experts and offshore operators to reduce the number of assumptions and provide clearer directions.

Important assumptions have been listed below to assist in the interpretation and implementation of this Procedure. If an aspect of this procedure is unclear, users must consider these assumptions in determining what action, if any, to take.

1. Vessel Captains and the Beach Senior Drilling Supervisor will follow the procedures detailed in this document taking into account Marine Mammal Observer (MMO) advice to minimise underwater sound impacts to whales.
2. Conservatism has been built into how the Activity Zone distances have been determined which accounts for MMO distance judgement accuracy, weather conditions, uncertainty in the impact assessment, and whale behaviour.
3. The distances-to- sound criteria and Activity Zones (Section 5.8) have been developed using acoustic modelling, which is described in the OGV Drilling Program EP. This modelling has been calibrated using in-field monitoring from a previous drilling campaign (JASCO 2021).
4. All blue whales are considered to be foraging regardless of whether the activity of foraging is observed. This assumption was added during the previous drilling campaign on advice from Blue Whale Study to ensure greater protection for blue whales in the area.
5. Any fin, pygmy right, sei or unidentified whale assumed to be foraging from 1 November to 30 June. Outside of this time foraging to be observed.

If there is a lack of clarity, or residual uncertainty, about the instructions in this procedure users are required to take actions in a manner that i) minimises noise threats to whales, ii) are precautionary and, iii) will keep impacts within the defined acceptable levels specified in the Environment Plan.

3. Context

This Procedure relates to the OGV Drilling Program and the OGV Drilling Program EP to ensure compliance with the EP EPOs, EPSs and control measures, as noted above.

For the OGV Drilling Program there are three activities that this procedure applies to

- Anchor pre-lay & Rig moves to new well location.
- Drilling and Plug & Abandonment.
- Vessel resupplying the rig.

Each of these activities have been assessed in the OGV Drilling EP. Relevant details from the impact assessment in the EP are included in this Procedure.

4. Observation of Whales

Many species of whales are present in the offshore area covered by the OGV Drilling Program. Whale species of concern have been noted above and have been seen in the activity area during previous campaigns.

Whale species that have been observed in the area include blue whales, southern right whales, pilot whales, minke whales, humpback whales, and Bryde's whales.

Blue whales may occur in the area at any time of year; however, peak periods for foraging tend to be from Nov / Dec to May / Jun each year.

Southern right whales may migrate through the area to their nearshore nursery grounds from April / October.

During the previous drilling campaign (2 February 2021 to 11 July 2022) over 13,500 hours of observations were undertaken.

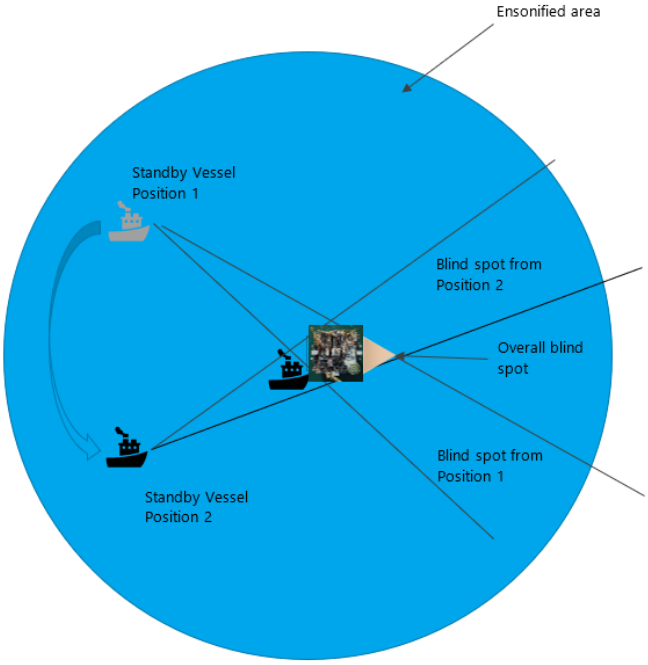
These observations only identified three (3) southern right whales migrating through the area.

A total of 127 blue whales were identified within 3 km of the drilling rig during this campaign. Of these 70 (55%) were observed moving towards the rig (following first detection) and 57 (45%) were observed moving away from the rig, indicating that the management measure in place for the campaign were effective in not displacing a foraging blue whale. Noting that:

- Published detection functions (Williams et al. 2016) and conservative assumptions were used to estimate blue whale densities in the management zones applied (0-500, 501-1,500, 1,501-2,000, 2,001-3,000, >3,000 m). If underwater noise was displacing blue whales, it would be expected less whales would be observed in the zones closest to the underwater noise. The expected densities of blue whales based on the detection function most closely matching the Lead MMOs advice indicated there was no difference in expected densities between any of the management zones (mean of 6.21 blue whales/km^2).
- The expected densities of blue whales based on the conservative detection functions showed similar results for the 0-500 and 501-1,500 m zones (means of 7.27 and 7.73 blue whales/km^2). However, they showed mean expected densities of 18.70 blue whales/km^2 and 22.91 blue whales/km^2 for the 1,501-2,000 and 2,001-3,000 m zones. Even if the conservative functions are used there is still no detectable difference in expected densities of blue whales in the 0-500 and 501-1,500 m zones, which conservatively means that blue whales are not displaced within 1,500 m of the noise source.

During the previous campaign the following adjustments were made to observations based on learnings from the MMO, independent experts and Operations Crew:

- Removal of MMO from rig. Originally an MMO was placed on the rig; however, there were significant issues relating to accurate observations due to the drilling deck obscuring the view. Additionally, there were no 'safe places' for observation, with the MMO having to use the helideck when it was not in use. The following procedure was developed for vessel observations:



When intending to undertake noise emitting activities (in this case *drilling* and *resupply* sub-activities), at least one vessel with a *MMO* on board shall be in the field to carry out whale observations.

The surveillance vessel shall endeavour to provide full observation coverage around the rig to minimise the blind spot behind the rig. When only one vessel in the field, this shall include sailing around the rig approximately every 6 hours (daylight hours) to minimise the blind spot behind the rig. When two vessels are in the field, the blind spot shall be minimised by stationing each vessel at opposing sides of the rig.

- Increase in number of MMOs assigned to the support vessels. Originally one MMO was proposed for the support vessels; however, during increased daylight hours observational hours were considerable (in excess of 15 hours a day). An additional, MMO was therefore provided on each vessel when daylight hours were greater than 12 hours.
- All blue whales are foraging. As noted above, MMOs found it difficult to detect the activity of foraging. It was, therefore, considered that all blue whales observed should be considered to be foraging.
- MMOs to provide advice to SDSV (see below) on whales entering the Activity Zones. This was one of the first activities that engaged MMOs for whale observations while drilling. The experienced MMOs were used to working on seismic surveys where an activity could be stopped immediately. During drilling there can be a significant risk to the environment and crew if drilling is stopped immediately. The MMOs, therefore, advised the SDSV of the presence of whales. The SDSV would then instigate a shutdown unless it was unsafe to do so. The SDSV would document the action taken and the reason behind this in the daily report.
- MMOs to track whale movements. MMOs commenced triangulating whale movements once observed within the action area to determine direction and time in the area.

5. Roles and Responsibilities

5.1 Beach Senior Drilling Supervisor (SDSV).

- Maintain open communication with MMOs.
- Regularly (daily or more often as operational changes dictate) communicate the status of the activities (i.e. commencing, underway, or at Safe Point) to MMOs.
- Liaise with the MMO and decide whether actions within this Procedure can safely be implemented and take action accordingly.
- Document reasons for not following this Procedure in the daily report and report to the Beach Drilling Superintendent and the Beach Environmental Advisor why the activity could not be safely shut down.

5.2 Vessel Master

- Maintain open communication with MMOs.
- Liaise with the MMO and decide whether actions within this procedure can safely be implemented and take action accordingly. Beach Environment Advisor
- Document reasons for not following this procedure in the daily report and report same to the Beach SDSV.
- Provides input into the review of effectiveness and compliance with the Whale Management Procedure.

5.3 Marine Mammal Observers (MMOs)

- MMOs must be trained and experienced in marine mammal observations.
- MMOs are to be familiar with the activity zones and actions as per this Procedure.
- Record all whale observations and track any species of concern whenever possible.
- Communicate with onshore whale experts whenever further clarification is required. (Dr P Gill at Blue Whale Study).
- Maintain whale observation watch throughout daylight hours.
- Communicate whale sightings and advise on actions per this Procedure to Beach SDSV and Vessel Captains.

5.4 Beach Drilling Superintendent

- Ensure this procedure is communicated to all MMOs, Beach SDSV, other Beach personnel offshore and all third party and drilling contractor personnel on the MODU, all helicopter crew and all Vessel Captains and vessel crew.

5.5 All Vessel, Helicopter and MODU Crew

- Share information on whale sighting with MMOs.
- Understand the importance of whales in the area and complete an induction of the requirements of this Procedure and how it relates to their activities.
- Communicate whale sighting to MMOs as soon as possible.

5.6 Drilling Manager

- Ensuring that the WMP is communicated to all personnel working on the MODU, vessels and helicopters.
- Ensuring that the WMP is fully implemented.
- Ensuring that all reporting required by the WMP is completed in a timely and accurate manner.
- The WMP utilisation is regularly audited for compliance.

5.7 Beach Environmental Advisor

- Ensure this Procedure is updated. Communicate any changes to all MFOs, Drilling Superintendent, Beach Senior Drilling Supervisor and Vessel Masters.
- Accountable for ensuring that appropriately trained MFOs are available for all the associated vessels.
- Audit compliance against this procedure.
- Report non-compliance to the regulator.

5.8 Distance to Sound Criteria and Activity Zones

This Procedure is designed on a principle of escalating mitigation actions based on the proximity of the whale to the activity – the closer the whale to the activity the greater mitigation required. This principle has led to the creation of zones at distance intervals from the sound sources. These distances change for each activity and are based on the predicted sound levels received in the environment at the relevant sound criteria which are detailed in the OGV Drilling Program EP.

Table 6.1 **Table 6.1**specifies the distances to the modelled sound criteria and the link to the sub-activity zones. The resultant distance for each activity zone is emphasised in bold type. Distances have been rounded up from the Behavioural Response prediction to conservatively cater for observer inaccuracy in distance estimation and uncertainties in the impact prediction.

Table 6.2 provides details on the Actions that should be undertaken based on the Activity that is being performed.

Activity	Activity Zone	Activity Zone Distance from well location	PTS 24 hr	TTS 24hr	Behavioural Response
VIC/P43 VIC/P73 Geographe 1					
Anchor prelay & Rig mooring	Pre-survey Zone	**7.5 km**	Not reached	0.95 km	7.02 km
Drilling and P&A	Rig Safe Point Zone	**1.5 km**	Not reached	0.31 km	1.17 km
Resupply	Resupply Zone	**7.5 km**	Not reached	0.95 km	7.02 km
T/30P*					
Anchor prelay & Rig mooring	Pre-survey Zone	**20 km**	0.1 km	1.48 km	19.6 km

Activity	Activity Zone	Activity Zone Distance from well location	PTS 24 hr	TTS 24hr	Behavioural Response
Drilling	MODU Safe Point Zone	**1.5 km**	Not reached	0.23 km	1.46 km
Resupply	Resupply Zone	**20 km**	0.1 km	1.48 km	19.6 km
Bass					
Anchor prelay Rig mooring	Pre-survey Zone	**6.5 km**	0.09 km	0.6 km	6.23 km
Drilling and P&A	MODU Safe Point Zone	**2.5 km**	0.02 km	0.33 km	2.12 km
Resupply	Resupply Zone	**6.5 km**	0.09 km	0.6 km	6.23 km

Table 6.1: Distance to Modelled Sound Criteria and Link to Activity Zones

6. Activity Actions and Mitigation Measures

Activity	Pre-start actions and start criteria	Safe Point	Actions to minimise noise and maintain safety and well integrity after the Activity has commenced if whales are observed
Anchor prelay	Prior to commencing anchor prelay, monitoring by an MMO will be undertaken of the Pre-survey Zone (See Section 5.8 for distances based on well location) for 30 min. Anchor prelay can commence to next Safe Point when absence of whales[1] in the Pre-survey Zone is confirmed[2].	Anchor deployed	If a whale[1] is observed within the Pre-survey Zone while anchor deployment is occurring, vessel to reduce thrusters if safe to do so. Anchor deployment will cease as soon as it is safe and will only recommence when absence of whales[2] in the Pre-survey Zone is confirmed.
Notes: 1: Whale means blue, fin, pygmy right, sei and southern right whales. 2: Absence of whales means: No whales observed for 30 min within the Pre-survey Zone. Whales observed leaving the Pre-survey Zone.			
Rig mooring	Prior to commencing mobilisation of the rig to a *new well location*[1], monitoring by an MMO will be undertaken of the Pre-survey Zone (See Section 5.8 for distances based on well location). Commence rig move to next Safe Point when absence of whales[2] in the Pre-survey Zone is confirmed[3].	Rig on location and securely anchored	Monitoring of the Pre-survey Zone will commence prior to the rig moving to the new location. If whales[2] are observed within the Pre-survey Zone whilst the rig is in transit to a new well location, the sighting will be communicated to the Beach SDSV and steps taken to allow time for the whales to move away. Vessels involved will comply with EPBC Regulations 8.1 Part 8 Division 8.1 interacting with cetaceans as per Section 8. Once the move has commenced, if whales[2] have been observed within the Pre-survey Zone the rig can only enter the Pre-survey Zone and commence mooring if: No whales[2] observed for 30 min within the Pre-survey Zone. Whales[2] observed leaving the pre-survey zone.
Notes: 1: A new well location does not include when the rig remains on the same anchor pattern and moves (kedges) to a new well as there is no additional sound source. 2: Whale means blue, fin, pygmy right, sei and southern right whales. 3: Absence of whales means:			

Activity	Pre-start actions and start criteria	Safe Point	Actions to minimise noise and maintain safety and well integrity after the Activity has commenced if whales are observed
No whales observed for 30 min within the Pre-survey Zone. Whales observed leaving the Pre-survey Zone.			The safety of the rig and other marine users necessitates such action. In this situation the decision will be made by the Beach SDSV in consultation with the Beach Drilling Superintendent and reasons documented.
Drilling	Survey Rig Safe Point Zone (See Section 5.8 for distances) prior to commencing drilling and at each Safe Point. Only proceed to next Safe Point when absence of whales is confirmed[1] from the Rig Safe Point Zone. Drilling can commence to the next Safe Point if monitoring cannot be undertaken of the Rig Safe Point Zone, such as at night or low visibility conditions, if: no more than three whales[1] have been seen in the Activity Zone in the 3 hours prior to sunset (using sunset times provided the Bureau of Meteorology); or confirmed absence of foraging whales[1] from Rig Safe Point Zone.	Next positive test of well integrity (e.g. after cementing each casing)	At all times noise producing operations on the rig should be minimised such as: Optimising load on generators. Reducing crane movements to minimum required for safety. Continue monitoring from all in-field vessels for whales. If drilling has commenced and *whales*[2] are observed within the Rig Safe Point Zone proceed to next Safe Point. Once well integrity has been confirmed implement the following noise minimisation actions as relevant and safety requirements allow: Reduce load on mud pumps and rotary drilling equipment. Reduce load on generators.
Notes: 1: Whale means blue, fin, pygmy right, sei and southern right whales. 2: Absence of whales means: No whales observed for 30 min within the Pre-survey Zone. Foraging whales observed leaving the Pre-survey Zone.			
Resupply	Prior to commencing resupply of the rig, monitoring by an MMO will be undertaken of the Resupply Zone (See Section 5.8 for distances).	Resupply complete	Continue monitoring from all in-field vessels for whales. If resupply has commenced and whales[1] are observed within the Resupply Zone while resupply is occurring vessel to reduce thrusters if safe to do so.

Activity	Pre-start actions and start criteria	Safe Point	Actions to minimise noise and maintain safety and well integrity after the Activity has commenced if whales are observed
	Resupply can proceed to next Safe Point when *absence of whales*[3] is confirmed from the Resupply Zone. Resupply can commence to the next Safe Point if monitoring cannot be undertaken of the Resupply Zone, such as at night or low visibility conditions, if: no more than three whales[1] have been seen in the Activity Zone in the 3 hours prior to sunset (using sunset times provided the Bureau of Meteorology); or confirmed absence of foraging whales[1] from Rig Safe Point Zone.		Resupply will cease as soon as it is safe, and not recommence until absence of whales[2] is confirmed.

Notes:

1: *Whale* means blue, fin, pygmy right, sei and southern right whales.

2: *Absence of whales* means:

No whales observed for 30 min within the Resupply Zone.

Foraging whales observed leaving the Resupply Zone.

Table 6.2: Activity and Actions to minimise noise

7. Procedural Flowchart during Activities

The following flowchart provides a decision tree to support the intentions built into

Activity	Pre-start actions and start criteria	Safe Point	Actions to minimise noise and maintain safety and well integrity after the Activity has commenced if whales are observed
Anchor prelay	Prior to commencing anchor prelay, monitoring by an MMO will be undertaken of the Pre-survey Zone (See Section 5.8 for distances based on well location) for 30 min. Anchor prelay can commence to next Safe Point when absence of whales1 in the Pre-survey Zone is confirmed2.	Anchor deployed	If a whale1 is observed within the Pre-survey Zone while anchor deployment is occurring, vessel to reduce thrusters if safe to do so. Anchor deployment will cease as soon as it is safe and will only recommence when absence of whales2 in the Pre-survey Zone is confirmed.
Notes: 1: Whale means blue, fin, pygmy right, sei and southern right whales. 2: Absence of whales means: No whales observed for 30 min within the Pre-survey Zone. Whales observed leaving the Pre-survey Zone.			
Rig mooring	Prior to commencing mobilisation of the rig to a *new well location1*, monitoring by an MMO will be undertaken of the Pre-survey Zone (See Section 5.8 for distances based on well location). Commence rig move to next Safe Point when absence of whales2 in the Pre-survey Zone is confirmed3.	Rig on location and securely anchored	Monitoring of the Pre-survey Zone will commence prior to the rig moving to the new location. If whales2 are observed within the Pre-survey Zone whilst the rig is in transit to a new well location, the sighting will be communicated to the Beach SDSV and steps taken to allow time for the whales to move away. Vessels involved will comply with EPBC Regulations 8.1 Part 8 Division 8.1 interacting with cetaceans as per Section 8. Once the move has commenced, if whales2 have been observed within the Pre-survey Zone the rig can only enter the Pre-survey Zone and commence mooring if: No whales2 observed for 30 min within the Pre-survey Zone. Whales2 observed leaving the pre-survey zone.
Notes: 1: A new well location does not include when the rig remains on the same anchor pattern and moves (kedges) to a new well as there is no additional sound source. 2: Whale means blue, fin, pygmy right, sei and southern right whales. 3: Absence of whales means:			

Activity	Pre-start actions and start criteria	Safe Point	Actions to minimise noise and maintain safety and well integrity after the Activity has commenced if whales are observed
No whales observed for 30 min within the Pre-survey Zone. Whales observed leaving the Pre-survey Zone.			The safety of the rig and other marine users necessitates such action. In this situation the decision will be made by the Beach SDSV in consultation with the Beach Drilling Superintendent and reasons documented.
Drilling	Survey Rig Safe Point Zone (See Section 5.8 for distances) prior to commencing drilling and at each Safe Point. Only proceed to next Safe Point when absence of whales is confirmed1 from the Rig Safe Point Zone. Drilling can commence to the next Safe Point if monitoring cannot be undertaken of the Rig Safe Point Zone, such as at night or low visibility conditions, if: no more than three whales1 have been seen in the Activity Zone in the 3 hours prior to sunset (using sunset times provided the Bureau of Meteorology); or confirmed absence of foraging whales1 from Rig Safe Point Zone.	Next positive test of well integrity (e.g. after cementing each casing)	At all times noise producing operations on the rig should be minimised such as: Optimising load on generators. Reducing crane movements to minimum required for safety. Continue monitoring from all in-field vessels for whales. If drilling has commenced and *whales2* are observed within the Rig Safe Point Zone proceed to next Safe Point. Once well integrity has been confirmed implement the following noise minimisation actions as relevant and safety requirements allow: Reduce load on mud pumps and rotary drilling equipment. Reduce load on generators.
Notes: 1: Whale means blue, fin, pygmy right, sei and southern right whales. 2: Absence of whales means: No whales observed for 30 min within the Pre-survey Zone. Foraging whales observed leaving the Pre-survey Zone.			
Resupply	Prior to commencing resupply of the rig, monitoring by an MMO will be undertaken of the Resupply Zone (See Section 5.8 for distances).	Resupply complete	Continue monitoring from all in-field vessels for whales. If resupply has commenced and whales1 are observed within the Resupply Zone while resupply is occurring vessel to reduce thrusters if safe to do so.

Activity	Pre-start actions and start criteria	Safe Point	Actions to minimise noise and maintain safety and well integrity after the Activity has commenced if whales are observed
	Resupply can proceed to next Safe Point when *absence of whales3* is confirmed from the Resupply Zone. Resupply can commence to the next Safe Point if monitoring cannot be undertaken of the Resupply Zone, such as at night or low visibility conditions, if: no more than three whales1 have been seen in the Activity Zone in the 3 hours prior to sunset (using sunset times provided the Bureau of Meteorology); or confirmed absence of foraging whales1 from Rig Safe Point Zone.		Resupply will cease as soon as it is safe, and not recommence until absence of whales2 is confirmed.

Notes:

1: *Whale* means blue, fin, pygmy right, sei and southern right whales.

2: *Absence of whales* means:

No whales observed for 30 min within the Resupply Zone.

Foraging whales observed leaving the Resupply Zone.

Table 6.2: Activity and Actions to minimise noise

. It covers how to make decisions when activities are underway. For pre-start actions refer to

Activity	Pre-start actions and start criteria	Safe Point	Actions to minimise noise and maintain safety and well integrity after the Activity has commenced if whales are observed
Anchor prelay	Prior to commencing anchor prelay, monitoring by an MMO will be undertaken of the Pre-survey Zone (See Section 5.8 for distances based on well location) for 30 min. Anchor prelay can commence to next Safe Point when absence of whales1 in the Pre-survey Zone is confirmed2.	Anchor deployed	If a whale1 is observed within the Pre-survey Zone while anchor deployment is occurring, vessel to reduce thrusters if safe to do so. Anchor deployment will cease as soon as it is safe and will only recommence when absence of whales2 in the Pre-survey Zone is confirmed.
Notes: 1: Whale means blue, fin, pygmy right, sei and southern right whales. 2: Absence of whales means: No whales observed for 30 min within the Pre-survey Zone. Whales observed leaving the Pre-survey Zone.			
Rig mooring	Prior to commencing mobilisation of the rig to a *new well location1*, monitoring by an MMO will be undertaken of the Pre-survey Zone (See Section 5.8 for distances based on well location). Commence rig move to next Safe Point when absence of whales2 in the Pre-survey Zone is confirmed3.	Rig on location and securely anchored	Monitoring of the Pre-survey Zone will commence prior to the rig moving to the new location. If whales2 are observed within the Pre-survey Zone whilst the rig is in transit to a new well location, the sighting will be communicated to the Beach SDSV and steps taken to allow time for the whales to move away. Vessels involved will comply with EPBC Regulations 8.1 Part 8 Division 8.1 interacting with cetaceans as per Section 8. Once the move has commenced, if whales2 have been observed within the Pre-survey Zone the rig can only enter the Pre-survey Zone and commence mooring if: No whales2 observed for 30 min within the Pre-survey Zone. Whales2 observed leaving the pre-survey zone. The safety of the rig and other marine users necessitates such action. In this situation the decision will be made by the Beach SDSV in consultation with the Beach Drilling Superintendent and reasons documented.
Notes: 1: A new well location does not include when the rig remains on the same anchor pattern and moves (kedges) to a new well as there is no additional sound source. 2: Whale means blue, fin, pygmy right, sei and southern right whales. 3: Absence of whales means: No whales observed for 30 min within the Pre-survey Zone. Whales observed leaving the Pre-survey Zone.			

Activity	Pre-start actions and start criteria	Safe Point	Actions to minimise noise and maintain safety and well integrity after the Activity has commenced if whales are observed
Drilling	Survey Rig Safe Point Zone (See Section 5.8 for distances) prior to commencing drilling and at each Safe Point. Only proceed to next Safe Point when absence of whales is confirmed1 from the Rig Safe Point Zone. Drilling can commence to the next Safe Point if monitoring cannot be undertaken of the Rig Safe Point Zone, such as at night or low visibility conditions, if: no more than three whales1 have been seen in the Activity Zone in the 3 hours prior to sunset (using sunset times provided the Bureau of Meteorology); or confirmed absence of foraging whales1 from Rig Safe Point Zone.	Next positive test of well integrity (e.g. after cementing each casing)	At all times noise producing operations on the rig should be minimised such as: Optimising load on generators. Reducing crane movements to minimum required for safety. Continue monitoring from all in-field vessels for whales. If drilling has commenced and *whales2* are observed within the Rig Safe Point Zone proceed to next Safe Point. Once well integrity has been confirmed implement the following noise minimisation actions as relevant and safety requirements allow: Reduce load on mud pumps and rotary drilling equipment. Reduce load on generators.
Notes: 1: Whale means blue, fin, pygmy right, sei and southern right whales. 2: Absence of whales means: No whales observed for 30 min within the Pre-survey Zone. Foraging whales observed leaving the Pre-survey Zone.			
Resupply	Prior to commencing resupply of the rig, monitoring by an MMO will be undertaken of the Resupply Zone (See Section 5.8 for distances). Resupply can proceed to next Safe Point when *absence of whales3* is confirmed from the Resupply Zone. Resupply can commence to the next Safe Point if monitoring cannot be undertaken of	Resupply complete	Continue monitoring from all in-field vessels for whales. If resupply has commenced and whales1 are observed within the Resupply Zone while resupply is occurring vessel to reduce thrusters if safe to do so. Resupply will cease as soon as it is safe, and not recommence until absence of whales2 is confirmed.

Activity	Pre-start actions and start criteria	Safe Point	Actions to minimise noise and maintain safety and well integrity after the Activity has commenced if whales are observed
	the Resupply Zone, such as at night or low visibility conditions, if: no more than three whales1 have been seen in the Activity Zone in the 3 hours prior to sunset (using sunset times provided the Bureau of Meteorology); or confirmed absence of foraging whales1 from Rig Safe Point Zone.		

Notes:

1: *Whale* means blue, fin, pygmy right, sei and southern right whales.

2: *Absence of whales* means:

No whales observed for 30 min within the Resupply Zone.

Foraging whales observed leaving the Resupply Zone.

Table 6.2: Activity and Actions to minimise noise

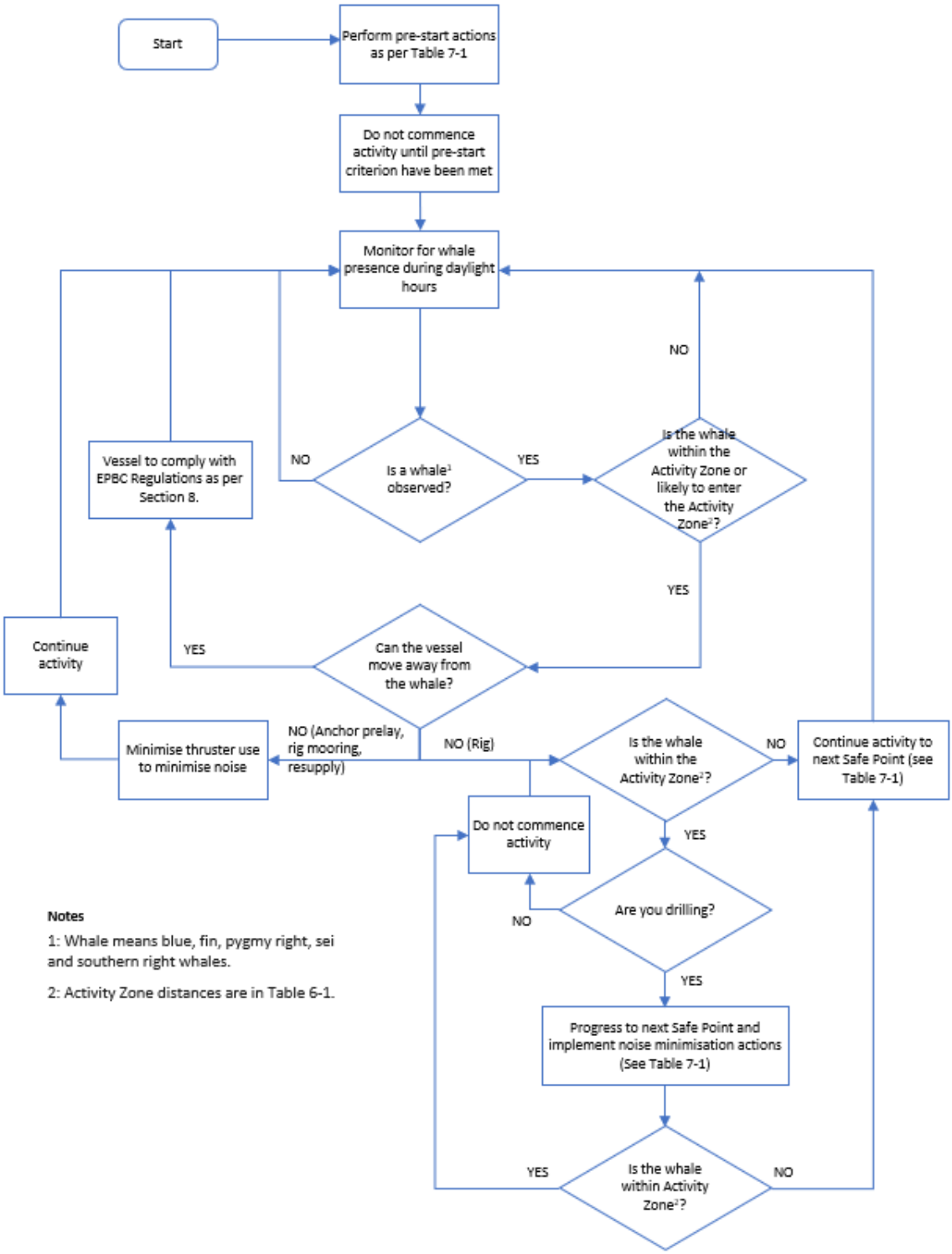


Figure 7.1: Procedural Flowchart during Activities

8. EPBC Regulations 2000 – Part 8 Division 8.1 Interacting with Cetaceans Requirement

8.1 Vessels and Whales

Vessel operators shall adhere to the distances and vessel management practices of EPBC Regulations (Part 8) and report vessel interactions with whales, specifically:

- Do not approach a whale.
- Maintain a distance of 300m from a whale.
- If a whale approaches the vessel try to maintain the separation distances without changing direction or moving into the path of the animal.

8.2 Vessels and Dolphins

Vessel operators shall adhere to the distances and vessel management practices of EPBC Regulations (Part 8) and report vessel interactions with dolphins specifically:

- Do not approach a dolphin.
- Maintain a distance of 150m from a dolphin.
- If a dolphin approaches the vessel try to maintain the separation distances without changing direction or moving into the path of the animal.

8.3 Helicopters and Whales and Dolphins

Helicopters will not fly lower than 1650 ft when within 500 m horizontal distance of a cetacean except when landing or taking off and will not approach a cetacean from head on.

9. Managing Uncertainty

Beach have undertaken an impact assessment of the potential impacts of underwater sound emissions on whales in accordance with its internal company procedures, international standards, and regulatory requirements. This utilised internationally accredited modelling and infield monitoring to further improve knowledge in this area.

Beach has been in contact with international experts in underwater acoustics (Brandon Southall (2020)) who has confirmed that we are using extremely conservative noise criteria for behavioural response from blue whales. He noted that a figure of 130 – 140 db SPL would be acceptable in our area as opposed to 120 db SPL that we currently model.

Whale detection is currently based on observations from professionals based on vessels in the field. These observations are the main control measure with subsequent mitigation measures cascading from these observations. Other forms of whale detection (specifically for low frequency cetaceans) using passive acoustic monitors (PAM) are not currently proven for offshore drilling activities.

Underwater hydrophones (PAM) have historically been used to monitor underwater noise over a period of time prior to being retrieved. This method does not provide a 'real-time' measure for detecting cetaceans and is not therefore useful as a mitigation measure.

Trials have been undertaken using PAM that are tethered to a buoy on the surface that can transmit acoustic data back to shore based MMOs.

In addition to these tethered systems, research is also underway with mobile hydrophones that use underwater gliders and surface vessels.

To manage this uncertainty Beach proposes to undertake the following:

- Whale Expert Panel – Beach will liaise with other Titleholders to develop an Expert Panel that can provide advice and recommendations in relation to i) robustness of any new whale detection systems, ii) implementation of any new whale detection system, and iii) changes to actions if there are ongoing delays to the start or restart of activities due to whales. The Whale Expert Panel will consist of whale experts and an MMO with experience of whales in southern Australia.
- Acoustic Trials – Based on advice from the Expert Panel, Beach will liaise with other Titleholders to support trials and potential testing of new and novel whale detection systems (as discussed above).

Appendix I Oil Spill Modelling Reports

I. 1. Otway Spill Modelling

OFFSHORE GAS VICTORIA

Oil Spill Modelling

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3 August 2023

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Document status

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TERMS AND ABBREVIATIONS

AMP	Australian Marine Park
AMSA	Australian Maritime Safety Authority
ANZECC	Australian and New Zealand Environment and Conservation Council
API	American Petroleum Institute gravity. A measure of how heavy or light a petroleum liquid is compared to water.
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
BIA	Biologically Important Areas
Bonn Agreement	An agreement for cooperation in dealing with pollution of the North Sea by oil and other harmful substances, 1983, includes: Governments of the Kingdom of Belgium, the Kingdom of Denmark, the French Republic, the Federal Republic of Germany, the Republic of Ireland, the Kingdom of the Netherlands, the Kingdom of Norway, the Kingdom of Sweden, the United Kingdom of Great Britain and Northern Ireland and the European Union.
BP	Boiling point. The temperature at which the vapor pressure of the liquid is equal to the pressure exerted on it by the surrounding atmosphere
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
Decay	The process where oil components are changed either chemically or biologically (biodegradation) to another compound. It includes breakdown to simpler organic carbon compounds by bacteria and other organisms, photo-oxidation by solar energy, and other chemical reactions.
Deterministic (single) oil spill modelling	Oil spill modelling involving a computer simulation of a single hypothetical oil spill event subject to a single sequence of wind, current and other sea conditions over time. Single oil spill modelling, also referred to as “deterministic modelling” provides a simulation of one possible outcome of a given spill scenario, subject to the metocean conditions that are imposed. Single oil spill modelling is commonly used to consider the fate and effects of ‘worst-case’ oil spill scenarios that are carefully selected in consideration of the nature and scale of the offshore petroleum activity and the local environment (NOPSEMA, 2017). Because the outcomes of a single oil spill simulation can only represent the outcome of that scenario under one sequence of metocean conditions, worst-case conditions are often identified from stochastic modelling. It is impossible to calculate the likelihood of any outcome from a single oil spill simulation. Single oil spill modelling is generally used for response planning, preparedness planning and for supporting oil spill response operations in the event of an actual spill
Dynamic viscosity	The dynamic viscosity of a fluid expresses its resistance to shearing flows, where adjacent layers move parallel to each other with different speeds.
Floating oil exposure	Contact by floating oil on the sea surface at concentrations equal to or exceeding defined threshold concentrations. The consequence will vary depending on the threshold and the receptors
HYCOM	Hybrid Coordinate Ocean Model. A data-assimilative, three-dimensional ocean model
HYDROMAP	Advanced ocean/coastal tidal model used to predict tidal water levels, current speed and current direction.
IMCRA	Integrated marine and coastal regionalisation areas
KEF	Key Ecological Feature
LGA	Local Government Areas
MAHs	Monoaromatic Hydrocarbons
MNP	Marine National Park
MP	Marine Park
MS	Marine Sanctuary
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
NP	National Park

NR	Nature Reserve
PAH	Polynuclear Aromatic Hydrocarbons
Pour Point	The pour point of a liquid is the temperature below which the liquid loses its flow characteristics
Ramsar site	A site listed under the Ramsar Convention on wetlands which is an international intergovernmental treaty that provides the framework for the conservation and wise use of wetlands and their resources.
RSB	Reefs, Shoals and Banks
Shoreline accumulation	Arrival of oil at or near shorelines at on-water concentrations equal to or exceeding defined threshold concentrations. Shoreline contact is judged for floating oil arriving within a 2 km buffer zone from any shoreline as a conservative measure
SIMAP	Spill Impact Model Application Package. SIMAP is designed to simulate the fate and effects of spilled hydrocarbons for surface or subsea releases
Stochastic (multiple) oil spill modelling	Stochastic oil spill modelling is created by overlaying and statistically analysing the outcomes of many single oil-spill simulations of a defined spill scenario, where each simulation was subject to a different sequence of metocean conditions, selected objectively (typically by random selection) from a long sequence of historic conditions for the study area. Analysis of this larger set of simulations provides a more accurate indication of the environment that maybe affected (EMBA) and indicates which locations are more likely to be affected (as well as other statistics). Stochastic oil spill modelling avoids biases that affect single oil spill modelling (due to the reliance on only one possible sequence of conditions). However, when interpreting stochastic modelling, which is based on a wide range of potential conditions that might happen to occur, it is essential to understand that calculations will encompass a much larger area than could be affected in any single spill event, where a more limited set of conditions will occur. Consequently, it is misleading to imply that the region derived from stochastic modelling indicate the outcomes expected from a single spill event (NOPSEMA, 2017) Stochastic modelling is generally used for risk assessment and preparedness planning by indicating locations that could be exposed and may require response or subsequent impact assessment
Sub-LGA	Sub-Local Government Areas
Shoreline accumulation	Arrival of oil at or near shorelines at on-water concentrations equal to or exceeding defined threshold concentrations.

EXECUTIVE SUMMARY

Background

Beach Energy Limited (Beach) plans exploration drilling at several new locations within the Otway Basin. The Release Location South and Release Location North locations were selected as the two representative locations for assessment due to their location and potential flow rates for a loss of well control incident.

In order to support the Offshore Gas Victoria EP, Beach commissioned a detailed oil spill modelling study assessing the following hypothetical scenarios:

- A 97,171.8 m^3 subsea release of condensate over 86 days from a loss of well control at the Release Location South
- A 603.7 m^3 surface release of marine diesel over 6 hours from a loss of containment from vessel collision at the Release Location South
- A 69,120.0 m^3 subsea release of condensate over 86 days from a loss of well control at the Release Location North; and
- A 603.7 m^3 surface release of marine diesel over 6 hours from a loss of containment from vessel collision at the Release Location North.

The modelling assessment was undertaken on a seasonal basis as follows:

- Summer (November through to March); and
- Winter (April to October)

The purpose of the modelling is to provide an understanding of a conservative 'outer envelope' of the potential area that may be affected in the unlikely event of hydrocarbon spill. The modelling does not take into consideration any of the spill prevention, mitigation and response strategies that would be implemented in response to a spill. Therefore, the modelling results represent the maximum extent that the released hydrocarbon may influence.

The spill modelling was performed using an advanced three-dimensional trajectory and fates model; Spill Impact Model Application Program (SIMAP). The SIMAP model calculates the transport, spreading, entrainment and evaporation of spilled hydrocarbons over time, based on the prevailing wind and current conditions and the physical and chemical properties.

Methodology

The modelling study was carried out in several stages. Firstly, a 10-year wind and current dataset (2010–2019) was generated and the currents included the combined influence of three-dimensional large-scale ocean currents and tidal currents. Secondly, the currents, winds and detailed hydrocarbon characteristics were used as inputs in the three-dimensional oil spill model (SIMAP) to simulate the drift, spread, weathering and fate of the spilled hydrocarbons.

As spills can occur during any set of wind and current conditions, modelling was conducted using a stochastic (random or non-deterministic) approach, which involved running 100 randomly selected single trajectory simulations per season, with each simulation having the same spill information (spill volume, duration and composition of hydrocarbons) but varying start times. This ensured that each spill simulation was subject to a unique set of wind and current conditions.

The SIMAP system, the methods and analysis presented herein, use modelling algorithms which have been anonymously peer reviewed and published in international journals. Further, RPS warrants that this work meets and exceeds the ASTM Standard F2067-13 "*Standard Practice for Development and Use of Oil Spill Models*".

Oil Properties

Thylacine condensate has an API of 44.3 and a density of 804.6 kg/m^3 (at 15ºC) with a viscosity value (0.87.0 cP) classifying it as a Group I (not-persistent) oil according to the International Tankers Owners Pollution Federation (ITOPF, 2020) and US EPA/USCG classifications.

The condensate is a mixture of volatile and persistent hydrocarbons with high proportions of volatile and semi- to low-volatile components. In favourable evaporation conditions, 64.0% of the oil mass should evaporate within the first 12 hours (BP < 180°C), a further 19.0% is expected to evaporate within the first 24 hours (180°C < BP < 265°C) and a further 16.0% should evaporate over several days (265°C < BP < 380°C). Approximately 1.0% of the condensate is shown to be persistent.

Marine diesel (MDO) has an API of 37.6 and a density of 829.1 kg/m^3 (at 25ºC) with a viscosity value (4.0 cP) classifying it as a Group II (light-persistent) oil according to the International Tankers Owners Pollution Federation (ITOPF, 2014) and US EPA/USCG classifications.

The MDO is a mixture of volatile and persistent hydrocarbons with high proportions of volatile and semi- to low-volatile components. In favourable evaporation conditions, about 6.0% of the oil mass should evaporate within the first 12 hours (BP < 180°C); a further 34.6% should evaporate within the first 24 hours (180°C < BP < 265°C); and a further 54.4% should evaporate over several days (265°C < BP < 380°C). Approximately 5.0% of the oil is shown to be persistent.

Results

Scenario: 86-day Loss of Well Control at Release Location South

- The maximum distance from the release location to the low (1–10 g/m^2), moderate (10–50 g/m^2) and high (>50 g/m^2) exposure zones was 79 km (east-southeast) during winter conditions, 20 km (southeast) during summer conditions and 1 km (west-southwest) during summer and winter conditions, respectively.

- Outside of the receptors that the Release Location South release location resides within, the Pygmy Blue Whale - Known Foraging Area (100% summer and winter), Little Penguin – Foraging (10 % in winter), Southern Right Whale - Connecting habitat (5% in summer and 50% in winter), White Shark – Foraging (2% in winter) and the White-faced Storm-petrel – Foraging (5% in summer and 50% in winter) were the only BIAs predicted to have floating oil exposure above the low threshold;

- The probability of accumulation to any shoreline at, or above, the low level (10 g/m^2) threshold was 89% during summer conditions and 100% during winter conditions;

- King Island recorded the highest probability of shoreline accumulation at the low threshold with 82% (summer) and 100% (winter);

- The maximum volume ashore for a single spill trajectory during the summer and winter conditions was 99 m^3 and 193 m^3, respectively, whilst the maximum length of shoreline accumulation at the low threshold was 115 km and 138 km, respectively;

- Outside of the receptors that the Release Location South resides within, the highest concentration of dissolved hydrocarbon was predicted for the Pygmy Blue Whale - Known Foraging Area (summer – 1,904 ppb, winter – 1,665 ppb) and White-faced Storm-petrel – Foraging (summer – 1,904 ppb, winter – 1,135 ppb) receptors, which also held the highest probabilities of low dissolved hydrocarbon exposure (100% during summer and winter); and

- Outside of the receptors that the Release Location South resides within, the highest concentration of entrained hydrocarbon was predicted for Pygmy Blue Whale - Known Foraging Area (1summer – ,1,454 ppb, winter – 1,464 ppb). The same receptor, along with Pygmy Blue Whale - Known Foraging Area, White-faced Storm-petrel – Foraging and West Tasmania Canyons also presented the highest probability of low entrained hydrocarbon exposure (100% during summer and winter).

Scenario: Loss of Marine Diesel Containment at Release Location South

- The maximum distance from the release location to the low (1–10 g/m^2), moderate (10–50 g/m^2) and high (> 50g/ m^2) exposure zones was 57 km (south-southeast) during winter conditions, and 48 km (south-southeast) during winter conditions and 8 km (south-southeast) during both seasons respectively;Outside of the receptors that the Release Location South resides within, floating oil exposure above the low threshold was predicted at the Zeehan AMP (38% summer and 39% winter) Pygmy Blue Whale - Known Foraging Area BIA (52% summer and 50% winter) and the West Tasmania Canyons KEF (13% summer and 15% winter);

- The probability of accumulation to any shoreline at, or above, the low level (10 g/m^2) threshold was 7% during summer conditions and 47% during winter conditions.

- The maximum volume ashore for a single spill trajectory during the summer and winter conditions was 5 m^3 and 29 m^3, respectively, whilst the maximum length of shoreline accumulation at the low threshold was 13 km and 35 km, respectively.

- Outside of the receptors that the Release Location South resides within, the highest concentration of dissolved hydrocarbon was predicted for the Pygmy Blue Whale - Known Foraging Area BIA (summer – 100 ppb, winter – 105 ppb), which also revealed the highest probability of low dissolved hydrocarbon exposure (summer – 39%, winter – 24%); and.

- Outside of the receptors that the Release Location South resides within, the highest concentration of entrained hydrocarbon was predicted for Pygmy Blue Whale - Known Foraging Area BIA (summer – 4,867 ppb, winter – 5,489 ppb). The same receptor recorded the highest probability of low entrained hydrocarbon exposure (90% summer and 85% winter).

Scenario: 86-day Loss of Well Control at Release Location North

- The maximum distance from the release location to the low (1–10 g/m^2) and moderate (10–50 g/m^2) exposure zones was 53 km (east) during summer conditions and 12 km (south-southeast) during winter conditions, respectively. For the high threshold (> 50 g/m^2), the maximum distance from the release location was 1 km southeast (summer) and northwest (winter);

- Outside of the receptors that the Release Location North resides within, floating oil exposure above the low threshold was predicted at the Pygmy Blue Whale – Foraging(10% summer, 3% winter) and Short-tailed Shearwater – Foraging (19% summer, 13% winter) BIAs;

- The probability of accumulation to any shoreline at, or above, the low level (10 g/m^2) threshold was 100% during summer conditions and 98% during winter conditions;.

- The maximum volume ashore for a single spill trajectory during the summer and winter conditions was 112 m^3 and 143 m^3, respectively, whilst the maximum length of shoreline accumulation at the low threshold was 108 km and 136 km, respectively;;

- Outside of the receptors that the Release Location North resides within, the highest concentration of dissolved hydrocarbon was predicted for Pygmy Blue Whale - Foraging BIA (summer – 1,396 ppb, winter – 1,410 ppb), which also revealed the highest probability of low dissolved hydrocarbon exposure (100% for both seasons); and

- Outside of the receptors that the Release Location North release location resides within, the highest concentration of entrained hydrocarbon was predicted for Pygmy Blue Whale - Foraging (summer – 378 ppb, winter – 332 ppb.

Scenario: Loss of Marine Diesel Containment at Release Location North

- The maximum distance from the release location to the low (1–10 g/m^2), moderate (10–50 g/m^2) and high (> 50 g/m^2) exposure zones was 54 km (east) during winter conditions, 19 km (south-southeast) during winter conditions and 10 km (north-northwest in summer and east in winter);.

- The probability of accumulation to any shoreline at, or above, the low level (10 g/m^2) threshold was 28% during summer conditions and 26% during winter conditions;.

- The maximum volume ashore for a single spill trajectory during the summer and winter conditions was 25 m^3 and 35 m^3, respectively, whilst the maximum length of shoreline accumulation at the low threshold was 26 km and 30 km, respectively;

- Outside of the receptors that the Release Location North resides within, the highest concentration of dissolved hydrocarbon was predicted for the Southern Right Whale - Aggregation BIA in summer (45 ppb) and in Apollo AMP in winter (31 ppb). The highest probability of low dissolved hydrocarbon exposure was recorded for Pygmy Blue Whale - Foraging BIA (summer – 3%, winter – 8%) and Short-tailed Shearwater – Foraging (summer – 3%, winter – 9%); and

- Outside of the receptors that the Release Location North resides within, the highest concentration of entrained hydrocarbon was predicted for Short-tailed Shearwater - Foraging BIA (summer – 801 ppb, winter – 1,326ppb), which also presented the highest probability of low entrained hydrocarbon exposure (summer – 51%, winter – 81%).

1 INTRODUCTION

1.1 Background

Beach Energy Limited (Beach) plans exploration drilling at several new locations within the Otway Basin. The Release Location South and Release Location North locations were selected as the two representative locations for assessment due to their location and potential flow rates for a loss of well control incident.

In order to support the Offshore Gas Victoria EP, Beach commissioned a detailed oil spill modelling study assessing the following hypothetical scenarios:

- A 97,171.8 m^3 subsea release of condensate over 86 days from a loss of well control at the Release Location South;
- A 603.7 m^3 surface release of marine diesel over 6 hours from a loss of containment from a vessel collision at the Release Location South
- A 69,120.0 m3 subsea release of condensate over 86 days from a loss of well control at the Release Location North; and
- A 603.7 m^3 surface release of marine diesel over 6 hours from a loss of containment from a vessel collision at the Release Location North.

The modelling assessment was undertaken on a seasonal basis as follows:

- Summer (November through to March); and
- Winter (April to October)

The purpose of the modelling is to provide an understanding of a conservative 'outer envelope' of the potential area that may be affected in the unlikely event of hydrocarbon spill. The modelling does not take into consideration any of the spill prevention, mitigation and response strategies that would be implemented in response to a spill. Therefore, the modelling results represent the maximum extent that the released hydrocarbon may influence.

The spill modelling was performed using an advanced three-dimensional trajectory and fates model; Spill Impact Model Application Program (SIMAP). The SIMAP model calculates the transport, spreading, entrainment and evaporation of spilled hydrocarbons over time, based on the prevailing wind and current conditions and the physical and chemical properties.

Table 1-1 Location of assessed release sites.

Well	Latitude	Longitude
Release Location South	39.7485° S	143.1637° E
Release Location North	38.8552° S	142.8381° E

GCS: WGS84

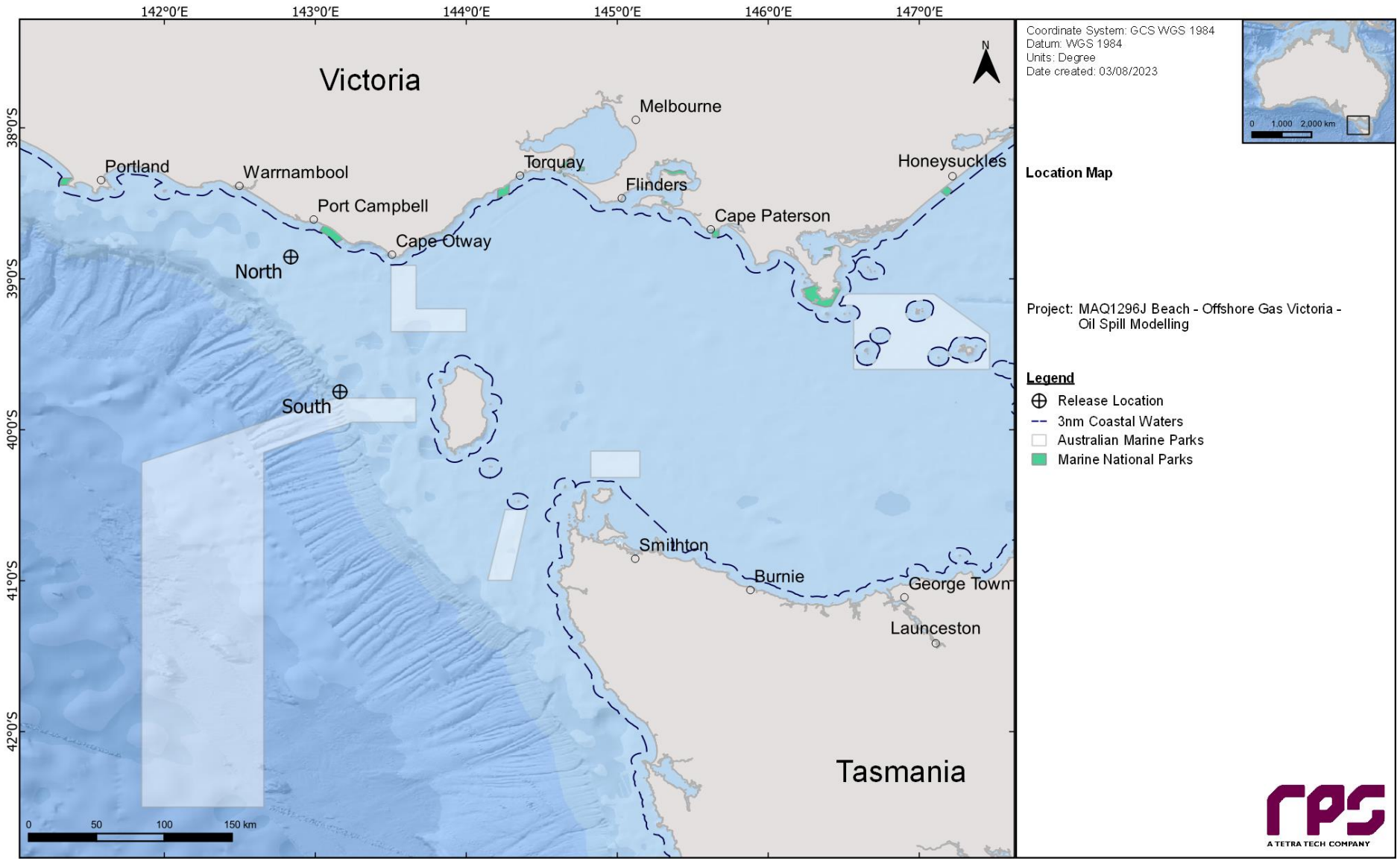

Figure 1-1 Map of the assessed release locations.

1.2 What is Oil Spill Modelling?

Oil spill modelling is a valuable tool widely used for risk assessment, emergency response and contingency planning where it can be particularly helpful to proponents and decision makers. By modelling a series of the most likely oil spill scenarios, decisions concerning suitable response measures and strategic locations for deploying equipment and materials can be made, and the locations at most risk can be identified. The two types of oil spill modelling often used are stochastic (Section 1.2.1) and deterministic (Section 1.2.2) modelling.

1.2.1 Stochastic Modelling (Multiple Spill Simulations)

Stochastic oil spill modelling is created by overlaying a great number (often hundreds) of individual, computer-simulated hypothetical spills (NOPSEMA, 2018; Figure 1.2).

Stochastic modelling is a common means of assessing the potential risks from oil spills related to new projects and facilities. Stochastic modelling typically utilises hydrodynamic data for the location in combination with historic wind data. Typically, 100 iterations of the model will be run utilising the data that is most relevant to the season or timing of the project.

The outcomes are often presented as a probability of exposure and is primarily used for risk assessment purposes in view to understand the range of environments that may be affected or impacted by a spill. Elements of the stochastic modelling can also be used in oil spill preparedness and planning.

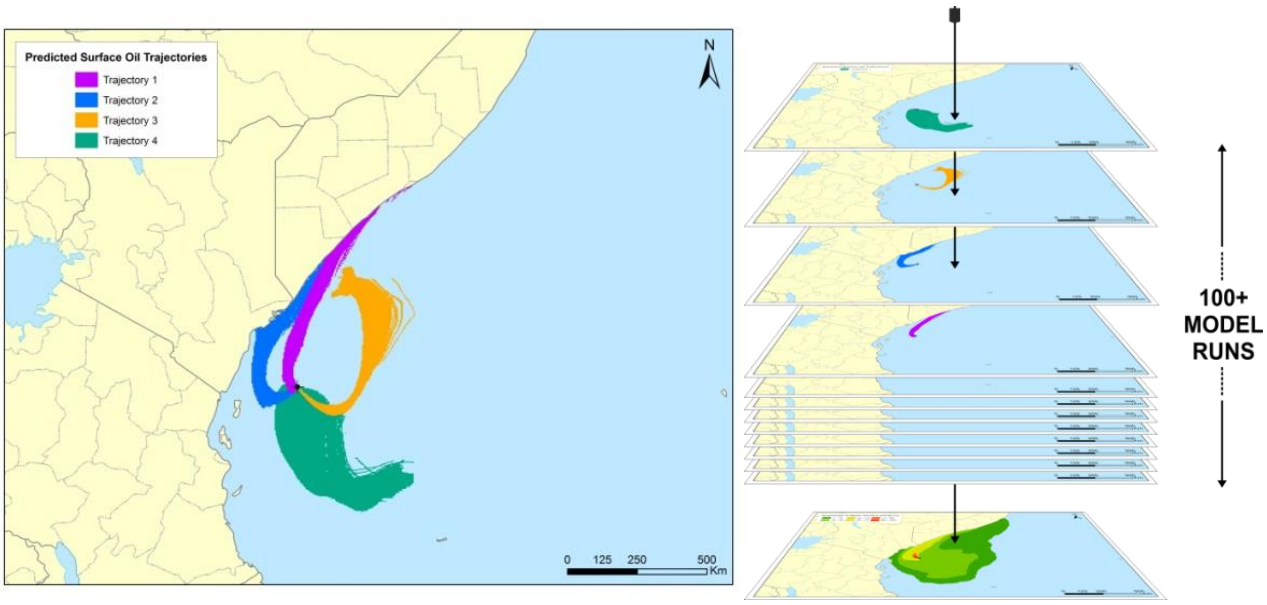

Figure 1-2 Examples of four individual spill trajectories (four replicate simulations) predicted by SIMAP for a spill scenario. The frequency of contact with given locations is used to calculate the probability of impacts during a spill. Essentially, all model runs are overlain (shown as the stacked runs on the right) and the number of times that trajectories contact a given location at a concentration is used to calculate the probability.

1.2.2 Deterministic Modelling (Single Spill Simulation)

Deterministic modelling is the predictive modelling of a single incident subject to a single sample of wind and weather conditions over time (NOPSEMA, 2018; Figure 1-3).

Deterministic modelling is often paired with stochastic modelling to place the large stochastic footprint into perspective. This deterministic analysis is generally a single run selected from the stochastic analysis and serves as the basis for developing the plans and equipment needs for a realistic spill response. Deterministic spills can be selected on several basis such as minimum time to shoreline, largest swept area, maximum volume ashore, longest length of shoreline contacted by oil or largest area of entrained or dissolved hydrocarbons.

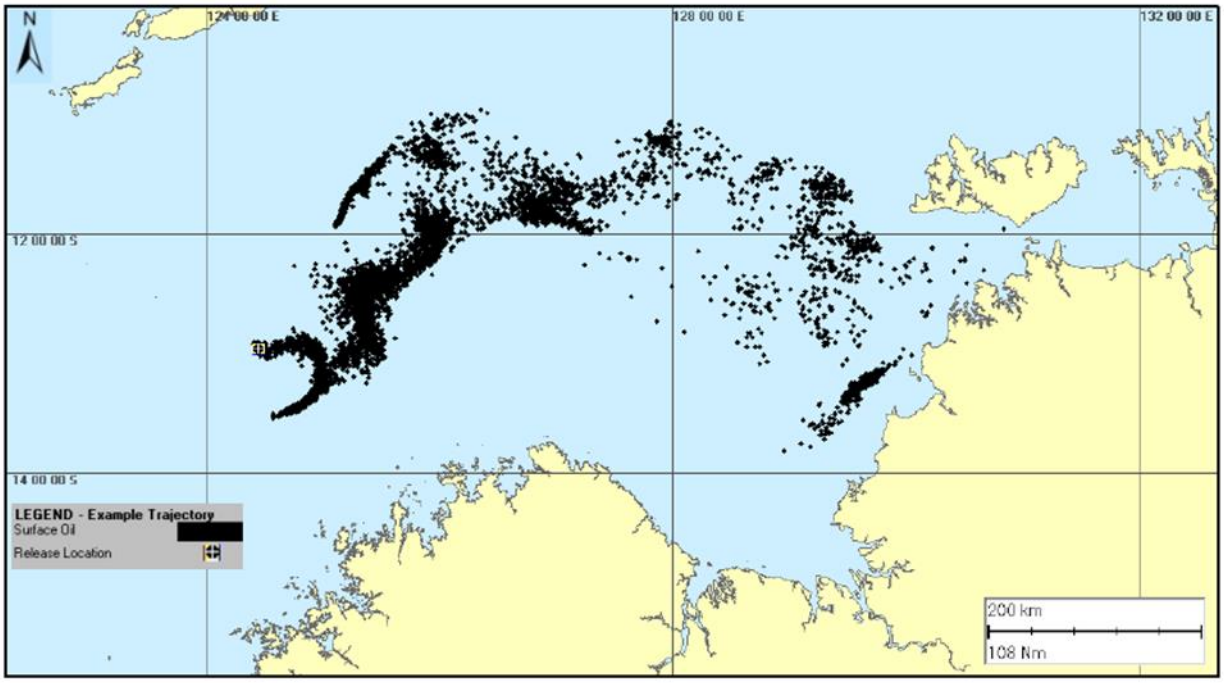

Figure 1-3 Example of an individual spill trajectory predicted by SIMAP for a spill scenario. Note, this image represents surface oil as spillets and do not take any thresholds into consideration.

2 SCOPE OF WORK

The scope of work included the following components:

- Generate 10-years of winds and three-dimensional currents from 2010 to 2019 (inclusive). The currents included the combined influence of tidal and ocean currents;
- Include the wind and current data and characteristics of the released hydrocarbons as input into the three-dimensional oil spill model (SIMAP), to model the movement, spreading, weathering and shoreline contact by hydrocarbons over time;
- Use SIMAP's stochastic model (also known as a probability model) to calculate exposure to surrounding waters and shorelines. This involved running 100 randomly selected single trajectory simulations per season, with each simulation having the same spill information (spill volume, duration and composition of hydrocarbons) but varying start times. This ensured that each spill simulation was subject to a unique set of wind and current conditions; and
- Results were assessed to determine the exposure to waters and contact to shorelines based upon the NOPSEMA thresholds; and

3 REGIONAL CURRENTS

Bass Strait is a body of water separating Tasmania from the southern Australian mainland, specifically the state of Victoria. The strait is a relatively shallow area of the continental shelf, connecting the southeast Indian Ocean with the Tasman Sea. Currents within the straight are primarily driven by tides, winds, incident continental shelf waves and density driven flows; high winds and strong tidal currents are frequent within the area (Jones, 1980).

The varied geography and bathymetry of the region, in addition to the forcing of the south-eastern Indian Ocean and local meteorology lead to complex shelf and slope circulation patterns (Middleton & Bye, 2007). Figure 3-1 displays seasonal current trends within the Bass Strait. During winter there is a strong eastward water flow due to the strengthening of the South Australian Current (fed by the Leeuwin Current in the Northwest Shelf), which bifurcates with one extension moving though the Bass Strait, and another forming the Zeehan Current off western Tasmania (Sandery & Kämpf, 2007). During summer, water flow reverses off Tasmania, King Island and the Otway Basin travelling eastward, as the coastal current develops due to south-easterly winds.

To accurately describe the variability in currents between the inshore and offshore region, a hybrid regional dataset was developed by combining deep ocean predictions obtained from HYCOM (Hybrid Coordinate Ocean Model) with surface tidal currents developed by RPS. The following sections provide a summary of the hybrid regional dataset.

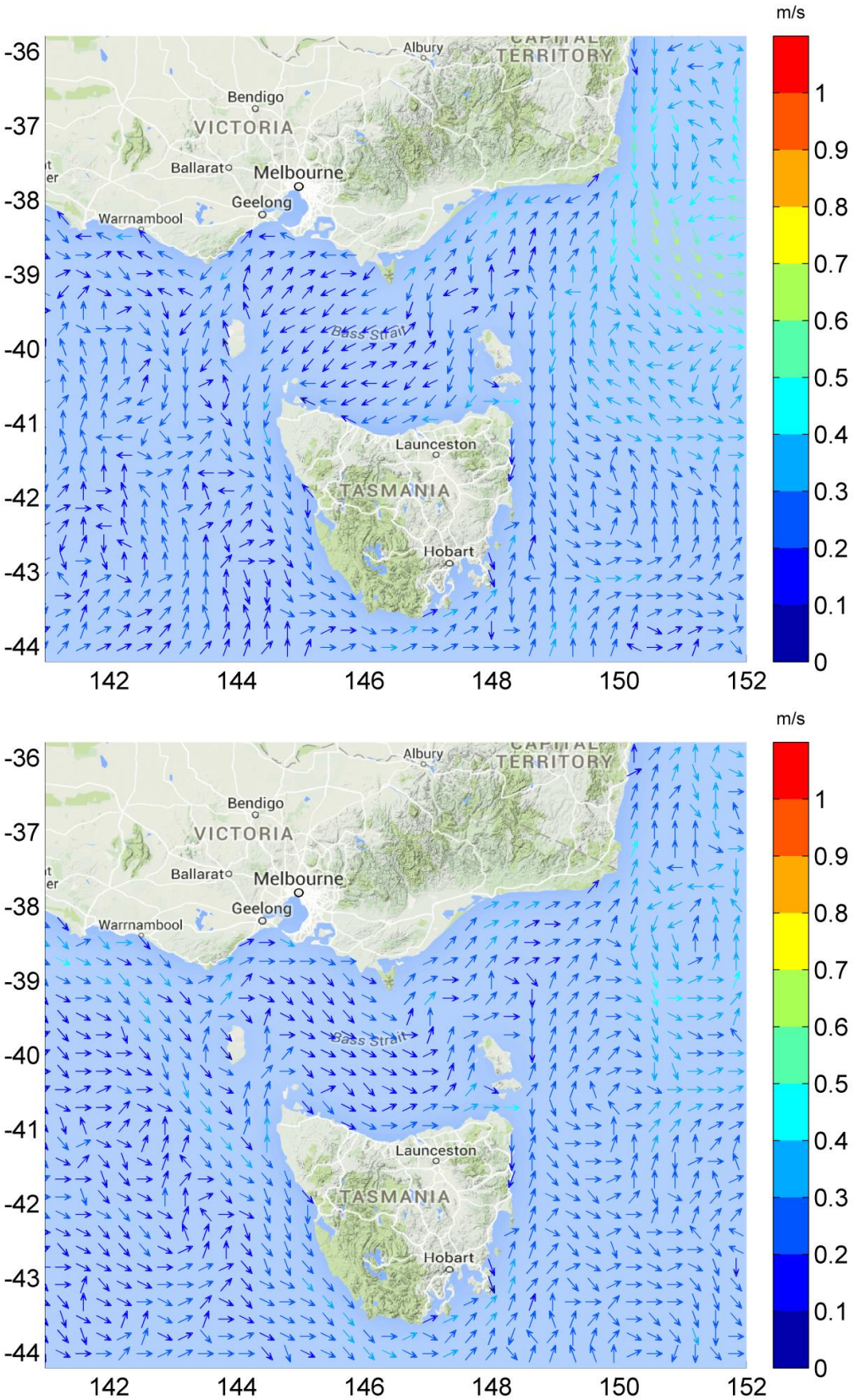

Figure 3-1 **HYCOM averaged seasonal surface drift currents during summer (upper image) and winter (lower image).**

3.1 Tidal Current Model

Tidal current data was generated using RPS's advanced ocean/coastal model, HYDROMAP. The HYDROMAP model has been thoroughly tested and verified through field measurements throughout the world for more than 30 years (Isaji & Spaulding, 1984; Isaji, et al., 2001; Zigic, et al., 2003). HYDROMAP tidal current data has been used as input to forecast (in the future) and hindcast (in the past) pollutant spills in Australian waters and forms part of the Australian National Oil Spill Emergency Response System operated by AMSA (Australian Maritime Safety Authority).

HYDROMAP employs a sophisticated sub-gridding strategy, which supports up to six levels of spatial resolution, halving the grid cell size as each level of resolution is employed. The sub-gridding allows for higher resolution of currents within areas of greater bathymetric and coastline complexity, and/or of interest to a study.

The numerical solution methodology follows that of Davies (1977a and 1977b) with further developments for model efficiency by Owen (1980) and Gordon (1982). A more detailed presentation of the model can be found in Isaji and Spaulding (1984) and Isaji et al. (2001).

3.1.1 Grid Setup

The tidal model domain is sub-gridded to a resolution of 500 m for shallow and coastal regions, starting from an offshore (or deep water) resolution of 8 km. The finer grids are progressively allocated in a step-wise fashion to more accurately resolve flows along the coastline, around islands and over regions with more complex bathymetry. Figure 3-2 shows the tidal model grid covering the study domain.

A combination of datasets was used and merged to describe the shape of the seabed within the grid domain (Figure 3-3). These included spot depths and contours which were digitised from nautical charts released by the hydrographic offices as well as Geoscience Australia database and depths extracted from the Shuttle Radar Topography Mission (SRTM30_PLUS) Plus dataset (see Becker et al., 2009).

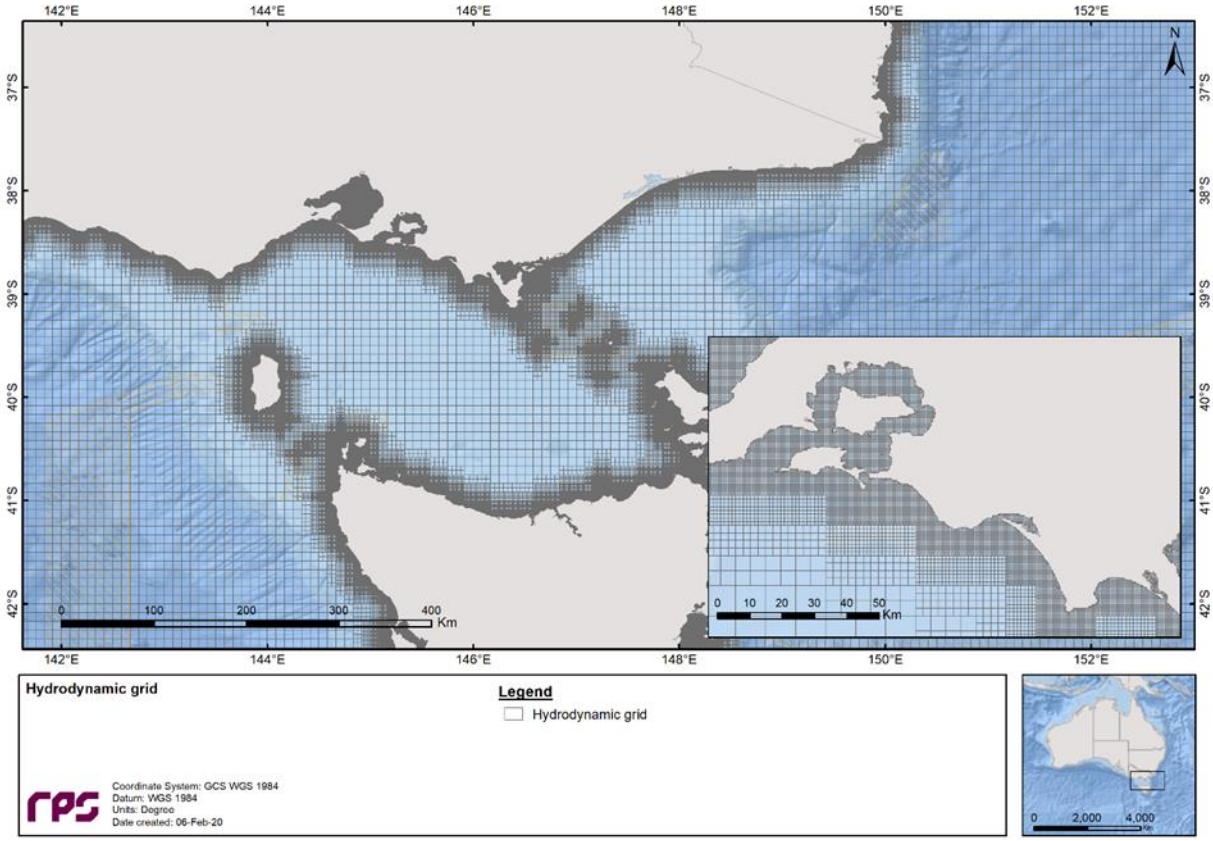

Figure 3-2 Sample of the model grid used to generate the tidal currents for the study region. Higher resolution areas are shown by the denser mesh.

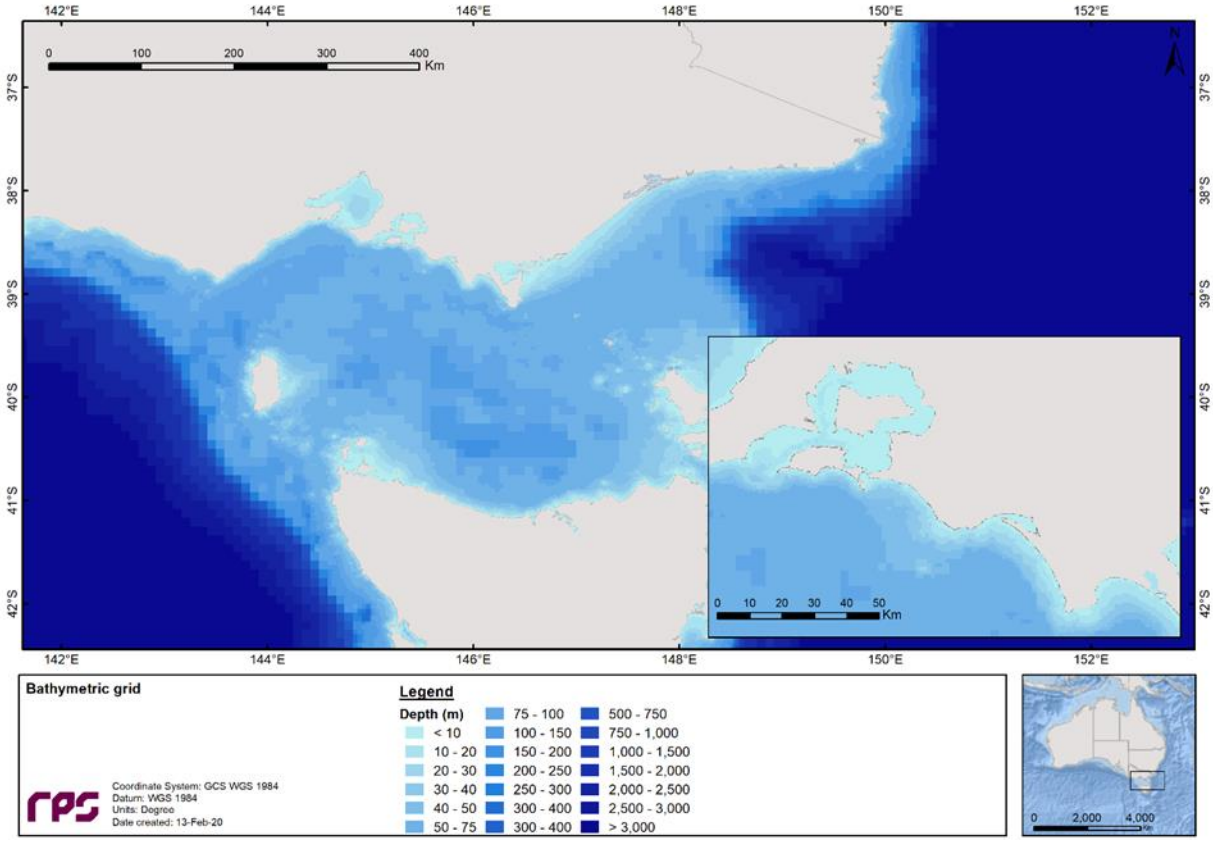

Figure 3-3 Bathymetry defined throughout the tidal model domain.

3.1.2 Tidal Conditions

The ocean boundary data for the regional model was obtained from satellite measured altimetry data (TOPEX/Poseidon 8.0) which provided estimates of the eight dominant tidal constituents at a horizontal scale of approximately 0.25 degrees. The eight major tidal constituents used were K_2, S_2, M_2, N_2, K_1, P_1, O_1 and Q_1. Using the tidal data, time series surface heights were calculated along the open boundaries for the simulation period.

The Topex/Poseidon satellite data has a resolution of 0.25 degrees globally, with higher resolution in coastal regions, and is produced and quality controlled by NASA (National Aeronautics and Space Administration). The data capturing satellites, equipped with two altimeters capable of taking sea level measurements accurate to less than ± 5 cm, measured oceanic surface elevations (and the resultant tides) for the period 1992–2005. In total these satellites carried out 62,000 orbits of the planet. The Topex/Poseidon tidal data has been widely used amongst the oceanographic community, being referenced in more than 2,100 research publications (e.g. Andersen, 1995; Ludicone et al., 1998; Matsumoto et al., 2000; Kostianoy et al., 2003; Yaremchuk & Tangdong, 2004; Qiu & Chen 2010). The Topex/Poseidon tidal data is considered suitably accurate for this study.

3.1.3 Surface Elevation Validation

To ensure that tidal predictions were accurate, predicted surface elevations were compared to data observed at a location situated within the study area (Figure 3-4).

To provide a statistical measure of the model performance, the Index of Agreement (IOA – Willmott, 1981) and the Mean Absolute Error (MAE – Willmott, 1982; Willmott & Matsuura, 2005) were used.

The MAE (Eq.1) is simply the average of the absolute values of the difference between the model-predicted (P) and observed (O) variables. It is a more natural measure of the average error (Willmott and Matsuura, 2005) and more readily understood. The MAE is determined by:

$$MAE = N^{-1} \sum_{i=1}^{N} |P_i - O_i| \qquad \text{Eq.1}$$

Where: N = Number of observations

P_i = Model predicted surface elevation

O_i = Observed surface elevation

The Index of Agreement (IOA; Eq. 2) in contrast, gives a non-dimensional measure of model accuracy or performance. A perfect agreement between the model predicted and observed surface elevations exists if the index gives an agreement value of 1, and complete disagreement between model and observed surface elevations will produce an index measure of 0 (Wilmott, 1981). Willmott et al. (1985) also suggests that values larger than 0.5 may represent good model performance. The IOA is determined by:

$$IOA = 1 - \frac{\sum |X_{model} - X_{obs}|^2}{\sum (|X_{model} - \overline{X_{obs}}| + |X_{obs} - \overline{X_{obs}}|)^2} \qquad \text{Eq.2}$$

Where: X_{model} = Model predicted surface elevation

X_{obs} = Observed surface elevation

Clearly, a greater IOA and lower MAE represent a better model performance.

Figure 3-5 and Figure 3-6 illustrate a comparison of the predicted and observed surface elevations in February 2017. As shown on the graph, the model accurately reproduced the phase and amplitudes throughout the spring and neap tidal cycles.

Table 3-1 shows the IOA and MAE values for the selected tide station locations indicating that the model is performing well.

Table 3-1 Statistical comparison between the observed and HYDROMAP predicted surface elevations.

Tide Station	IOA	MAE (m)
Gabo Island	0.98	0.08
Port MacDonnell	0.98	0.05
Port Welshpool	0.92	0.30
Portland	0.97	0.07
Stack Island	0.96	0.22

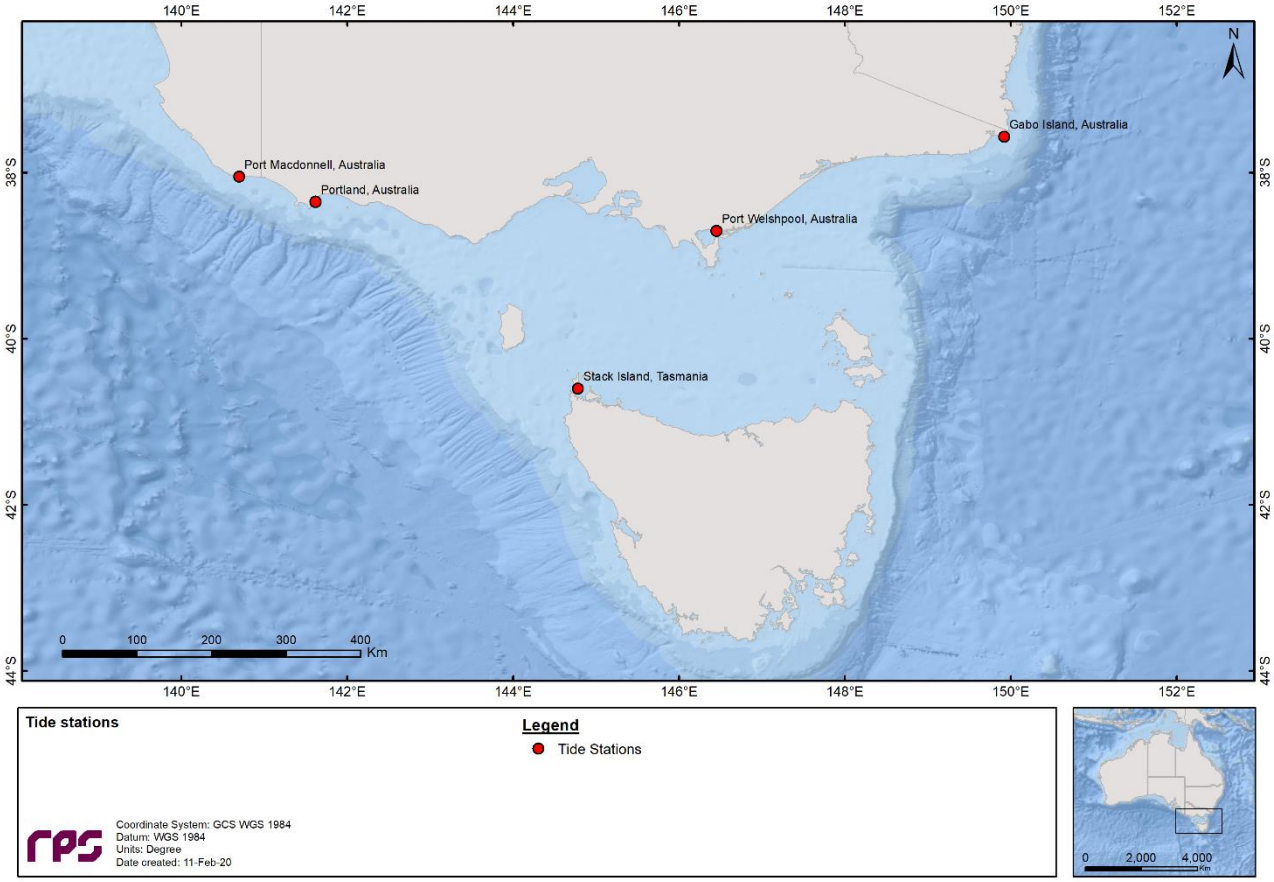

Figure 3-4 Location of the tide stations used in the surface elevation validation.

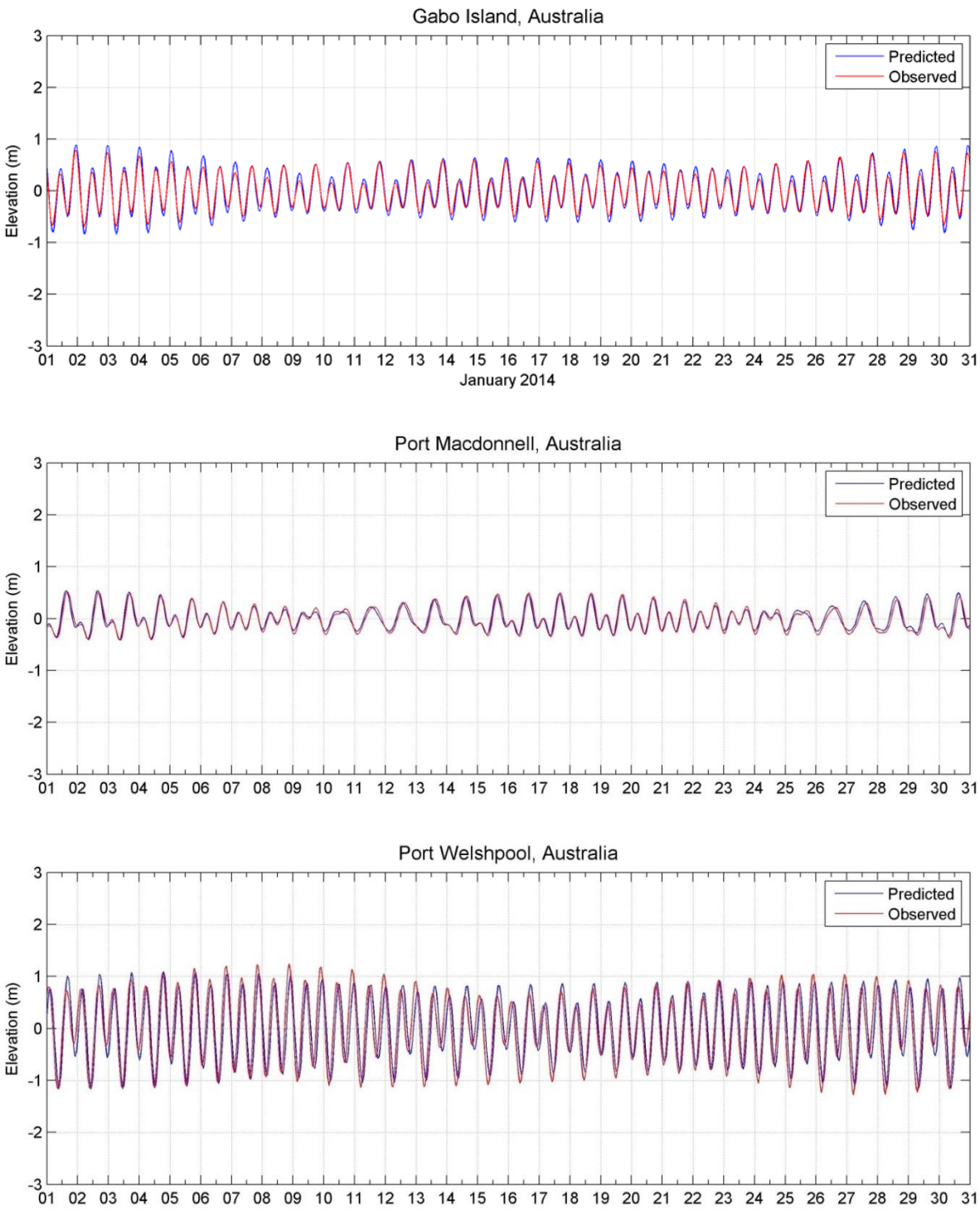

Figure 3-5 Comparison between HYDROMAP predicted (blue line) and observed (red line) surface elevation at tidal stations Gabo Island (upper image), Port MacDonnell (middle image) and Port Welshpool (lower image).

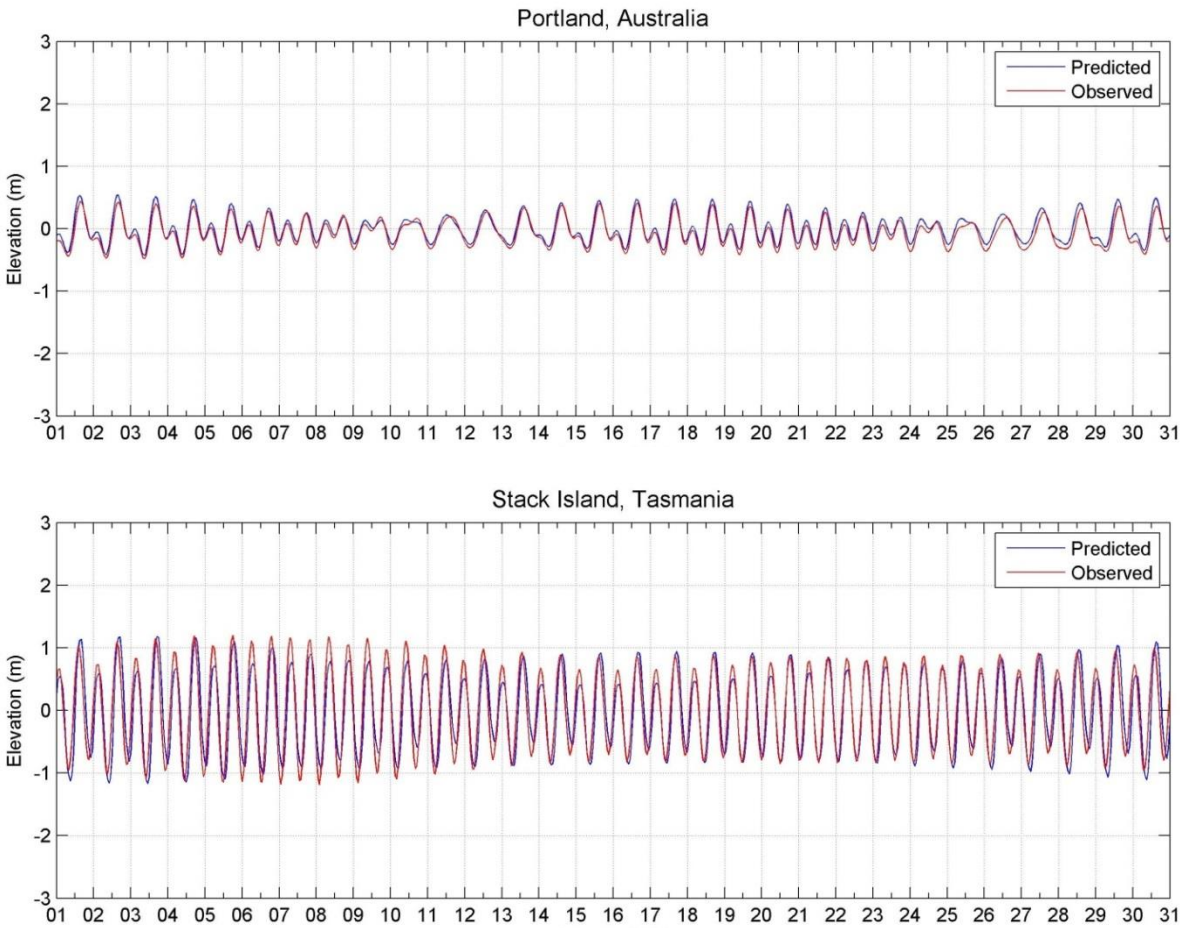

Figure 3-6 Comparison between HYDROMAP predicted (blue line) and observed (red line) surface elevation at tidal stations Portland (upper image) and Stack Island (lower image).

3.2 Ocean Current Model

Data describing the flow of ocean currents for the years 2010 to 2019 (inclusive) was obtained from HYCOM (Hybrid Coordinate Ocean Model, (Chassignet et al., 2007), which is operated by the HYCOM Consortium, sponsored by the Global Ocean Data Assimilation Experiment (GODAE). HYCOM is a data-assimilative, three-dimensional ocean model that is run as a hindcast (for a past period), assimilating time-varying observations of sea surface height, sea surface temperature and in-situ temperature and salinity measurements (Chassignet et al., 2009). The HYCOM predictions for drift currents are produced at a horizontal spatial resolution of approximately 8.25 km (1/12th of a degree) over the region, at a frequency of every 3 hours. HYCOM uses isopycnal layers in the open, stratified ocean, but uses the layered continuity equation to make a dynamically smooth transition to a terrain-following coordinate in shallow coastal regions, and to z-level coordinates in the mixed layer and/or unstratified seas.

3.3 Surface Currents

Table 3-2 and Table 3-3 present the monthly average and maximum net surface current speeds nearby the Release Location South and Release Location North, respectively, by combining the ocean and tidal currents. Current speeds varied throughout the year with monthly maximum current speeds ranging between 0.56 m/s (November) and 0.84 m/s (July) nearby Release Location South and 0.69 m/s (December) and 1.21 m/s (July) nearby Release Location North. The dominant surface current directions throughout the year were identified as (towards) south-southeast and east nearby the Release Location South and Release Location North, respectively.

Figure 3-7 to Figure 3-10 show the monthly and total surface current rose distributions nearby the release locations.

Note the convention for defining current direction is the direction the current flows towards, which is used to reference current direction throughout this report. Each branch of the rose represents the currents flowing to that direction, with north to the top of the diagram. Sixteen directions are used. The branches are divided into segments of different colour, which represent the current speed ranges for each direction. Speed intervals of 0.1 m/s are predominantly used in these current roses. The length of each coloured segment is relative to the proportion of currents flowing within the corresponding speed and direction.

Table 3-2 Predicted monthly average and maximum surface current speeds nearby the Release Location South release location. The data was derived by combining the HYCOM ocean data and HYDROMAP tidal data from 2010–2019 (inclusive).

Month	Average current speed (m/s)	Maximum current speed (m/s)	General direction(s) (towards)
January	0.18	0.76	South
February	0.17	0.78	South
March	0.19	0.68	South-southeast
April	0.20	0.68	South-southeast
May	0.24	0.82	Southeast
June	0.20	0.71	Southeast
July	0.23	0.84	Southeast
August	0.22	0.83	Southeast
September	0.19	0.63	Southeast
October	0.18	0.75	South-southeast
November	0.17	0.56	South-southeast
December	0.19	0.72	South-southeast
Minimum	0.17	0.56	-
Maximum	0.24	0.84	-

Table 3-3 Predicted monthly average and maximum surface current speeds nearby the Release Location North. The data was derived by combining the HYCOM ocean data and HYDROMAP tidal data from 2010–2019 (inclusive).

Month	Average current speed (m/s)	Maximum current speed (m/s)	General direction(s) (towards)
January	0.15	0.73	West
February	0.16	0.70	West
March	0.16	0.96	West
April	0.15	0.94	East
May	0.20	1.12	East
June	0.21	1.05	East
July	0.26	1.21	East
August	0.25	1.11	East
September	0.21	1.01	East
October	0.19	0.98	East
November	0.17	0.83	East
December	0.18	0.69	East
Minimum	0.15	0.69	-
Maximum	0.26	1.21	-

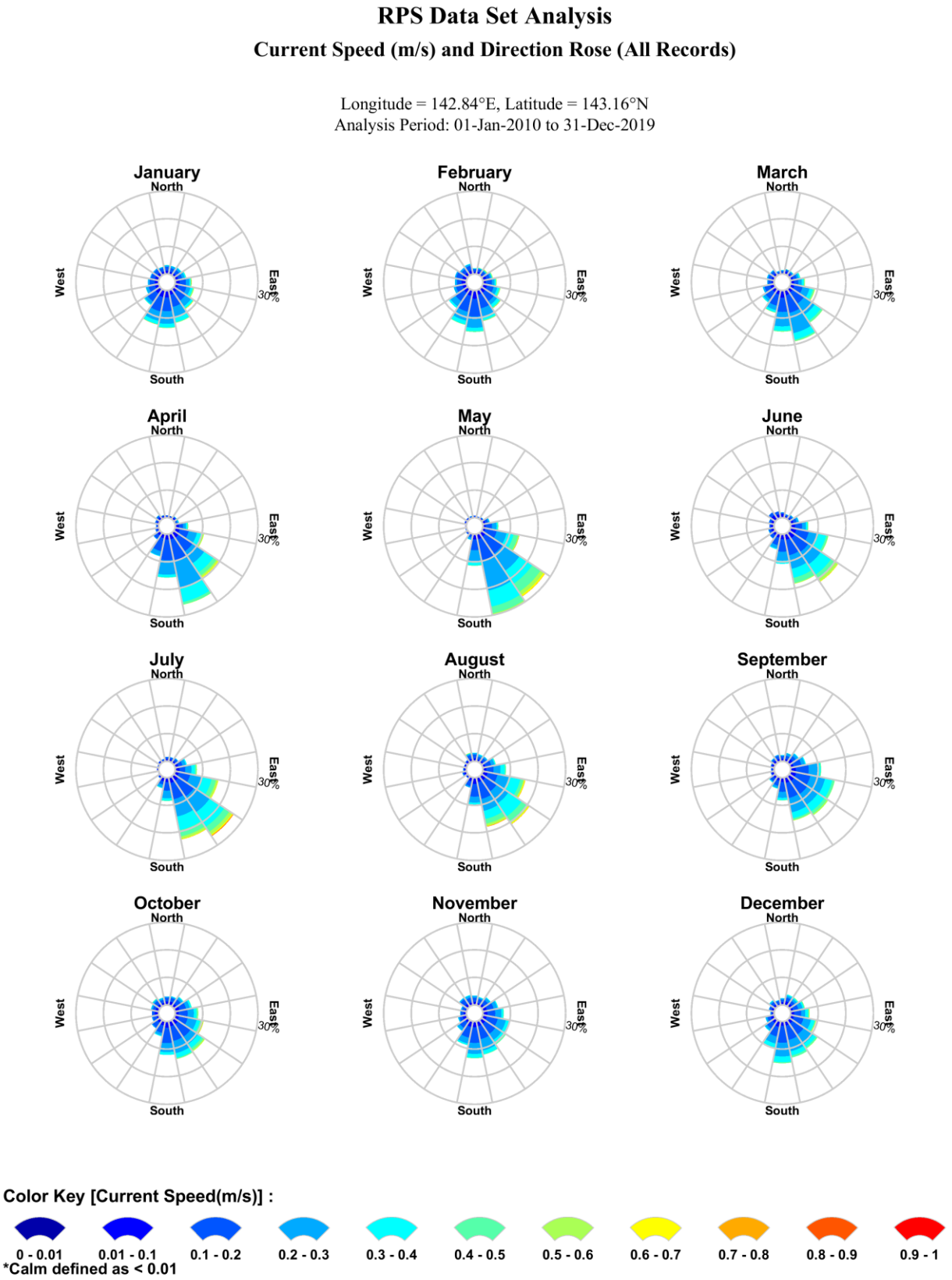

Figure 3-7 **Monthly surface current rose plots nearby the Release Location South (derived by combining the HYDROMAP tidal currents and HYCOM ocean currents for 2010–2019 (inclusive).**

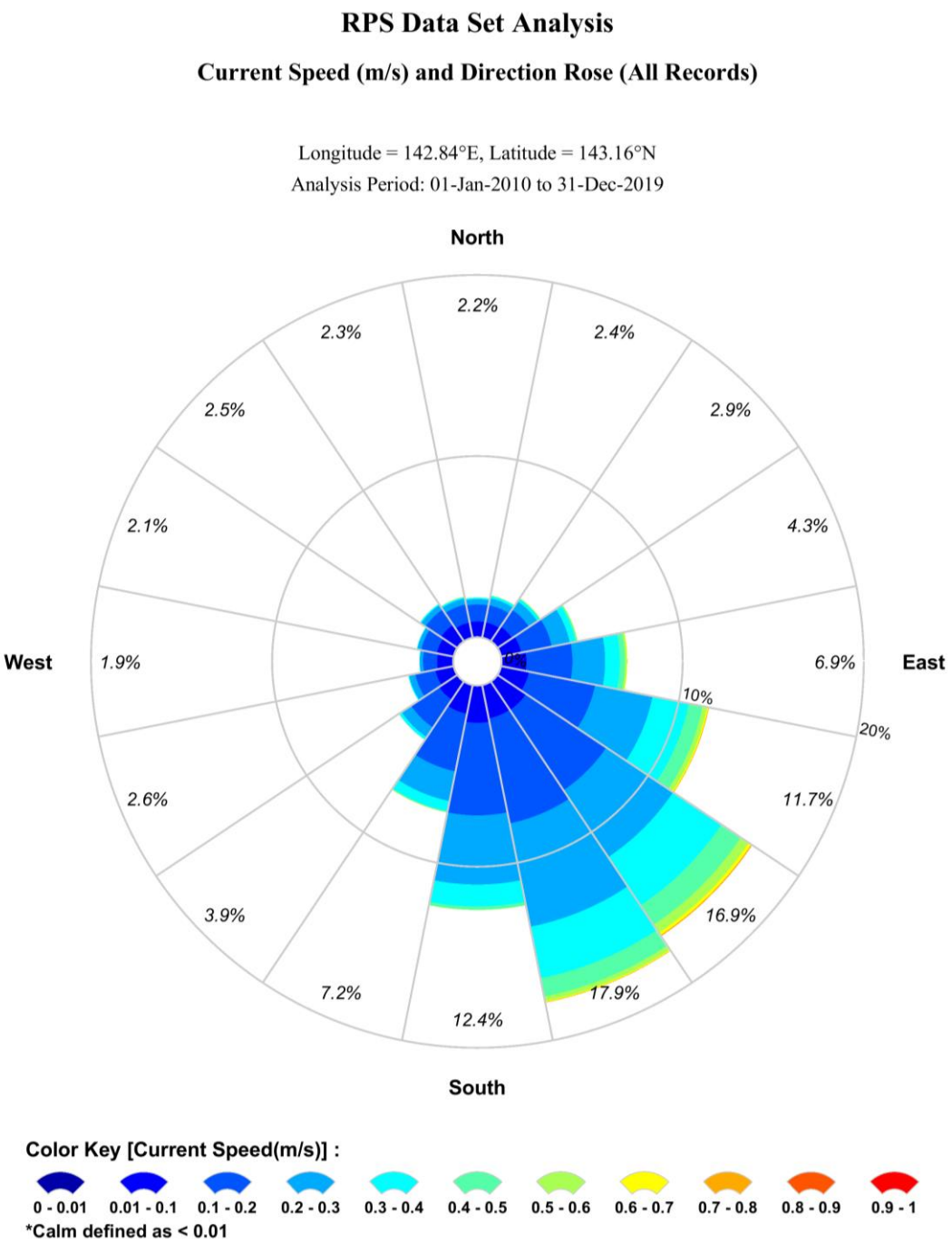

Figure 3-8 Total surface current rose plot nearby the Release Location South (derived by combining the HYDROMAP tidal currents and HYCOM ocean currents for 2010–2019 (inclusive).

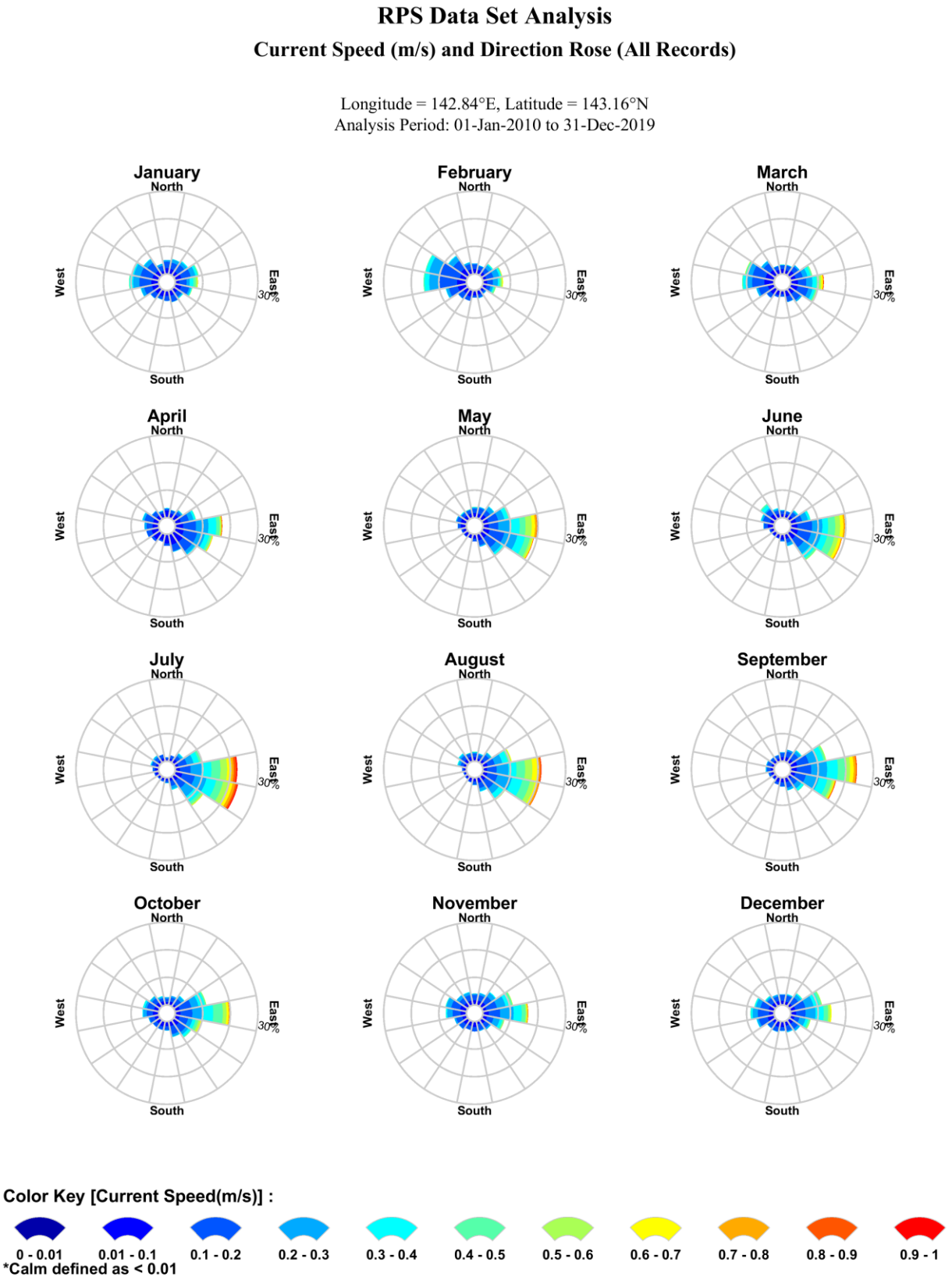

Figure 3-9 **Monthly surface current rose plots nearby the Release Location North (derived by combining the HYDROMAP tidal currents and HYCOM ocean currents for 2010–2019 (inclusive).**

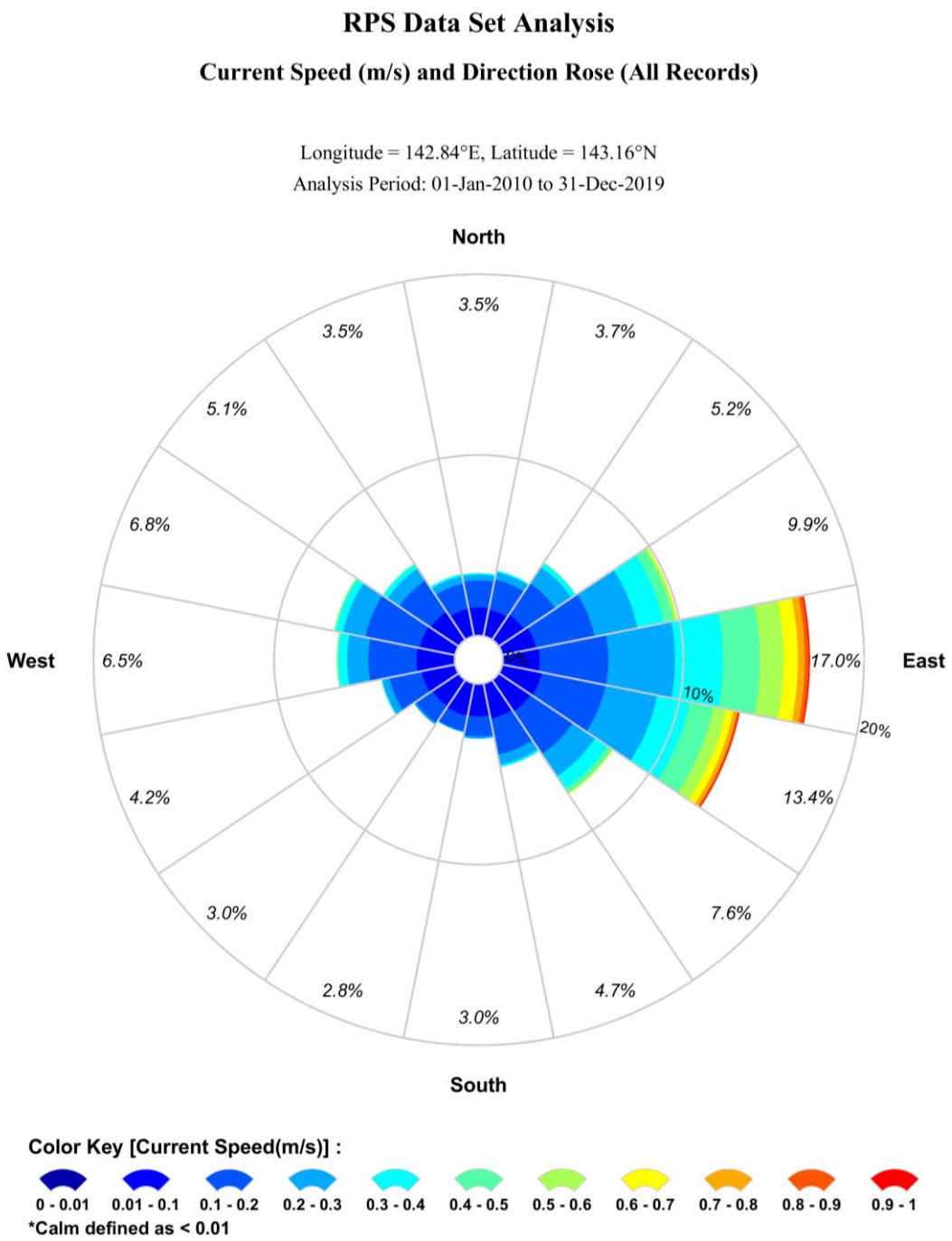

Figure 3-10 Total surface current rose plot nearby the Release Location North (derived by combining the HYDROMAP tidal currents and HYCOM ocean currents for 2010–2019 (inclusive).

4 WIND DATA

High resolution wind data for the years 2010 to 2019 (inclusive) was sourced from the National Centre for Environmental Prediction (NCEP) Climate Forecast System Reanalysis dataset (CFSR; see Saha et al., 2010). The CFSR wind model is a fully coupled, data-assimilative hindcast model representing the interaction between the earth's oceans, land and atmosphere. The gridded wind data output is available at ¼ of a degree resolution (~33 km) and 1-hourly time intervals. Figure 4-1 shows the spatial resolution of the wind field used as input into the oil spill model.

Table 4-1 and Table 4-2 present the monthly average and maximum winds derived from a CFSR wind node nearby the Release Location South and Release Location North, respectively. The wind data demonstrated average monthly wind speeds ranging from 14.20 knots (January) to 19.91 knots (July) with maximums ranging between 38.41 knots (November) and 49.73 knots (September) nearby the Release Location South. Additionally, nearby the Release Location North, average monthly wind speeds varied between 13.75 knots (January) and 19.35 knots (July), whilst maximums ranged from 38.87 knots (January) to 52.61 knots (June).

Near the Release Location South, the dominant wind direction varied throughout the year though was predominantly westerly. Nearby Release Location North the dominant wind direction also varied with winds also predominantly from the west.

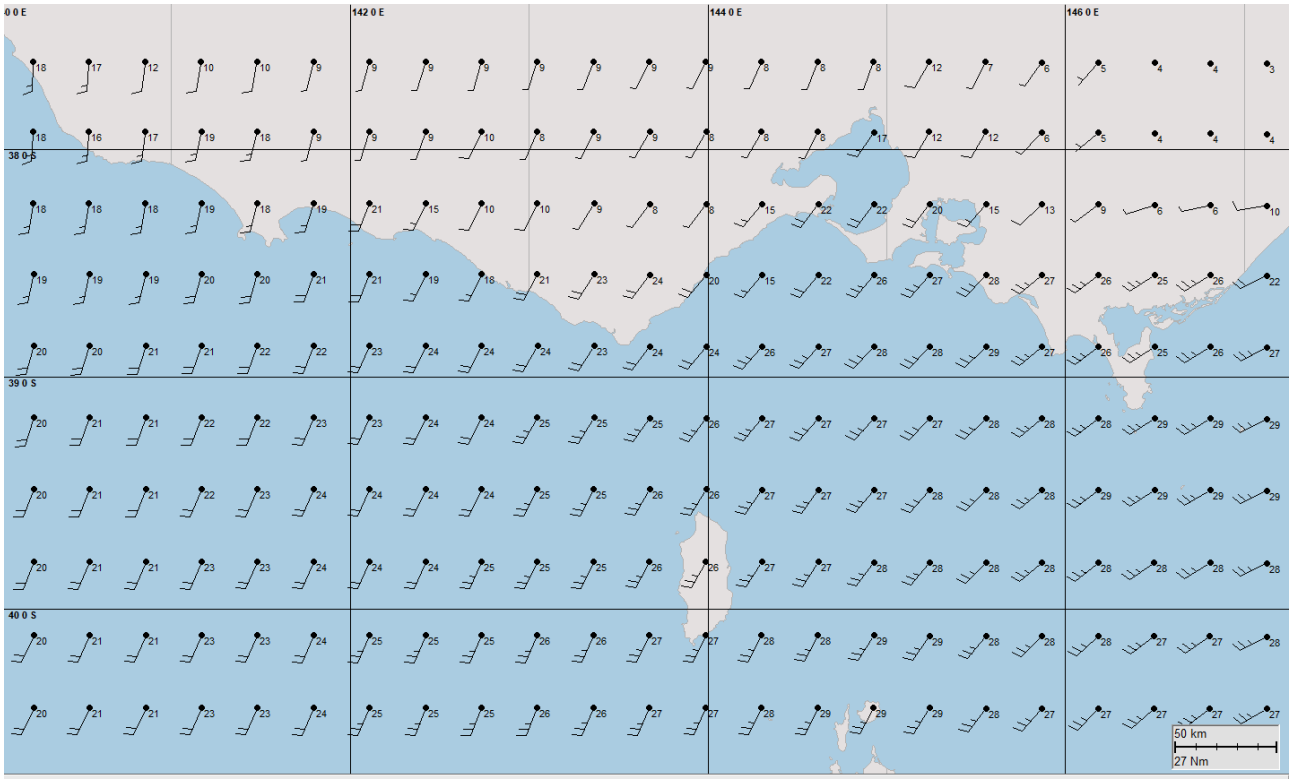

Figure 4-1 Spatial resolution of the CFSR modelled wind data used as input into the oil spill model.

Figure 4-2 to Figure 4-5 show the monthly and total wind rose distributions derived from the CFSR data for the selected node nearby the Release Location South and Release Location North.

Note that the atmospheric convention for defining wind direction, that is, the direction the wind blows from, is used to reference wind direction throughout this report. Each branch of the rose represents wind coming from that direction, with north to the top of the diagram. Sixteen directions are used. The branches are divided into segments of different colour, which represent wind speed ranges from that direction. Speed ranges of 5 knots are predominantly used in these wind roses. The length of each segment within a branch is proportional to the frequency of winds blowing within the corresponding range of speeds from that direction.

Table 4-1 Predicted average and maximum winds representative for the selected node nearby the Release Location South. Data derived from CFSR hindcast model from 2010–2019 (inclusive).

Month	Average wind speed (knots)	Maximum wind speed (knots)	General direction(s) (from)
January	14.20	40.60	Southeast
February	14.97	42.75	Southeast
March	14.94	43.46	West
April	14.99	45.60	West
May	17.45	48.90	West
June	17.54	45.47	Northwest
July	19.91	47.42	West-northwest
August	19.32	46.28	West
September	17.47	49.73	Southwest
October	16.37	45.39	West
November	15.43	38.41	West-southwest
December	14.92	40.75	West
Minimum	14.20	38.41	-
Maximum	19.91	49.73	-

Table 4-2 Predicted average and maximum winds representative for the selected node nearby the Release Location North. Data derived from CFSR hindcast model from 2010–2019 (inclusive).

Month	Average wind speed (knots)	Maximum wind speed (knots)	General direction(s) (from)
January	13.75	38.87	South
February	14.28	41.67	Southeast
March	14.25	44.22	West
April	13.88	42.13	West
May	16.59	45.38	West
June	16.71	52.61	Northwest
July	19.35	45.77	Northwest
August	18.75	47.47	Northwest
September	16.71	48.61	West
October	15.80	44.58	West
November	14.79	43.66	West
December	14.34	40.23	West
Minimum	13.75	38.87	-
Maximum	19.35	52.61	-

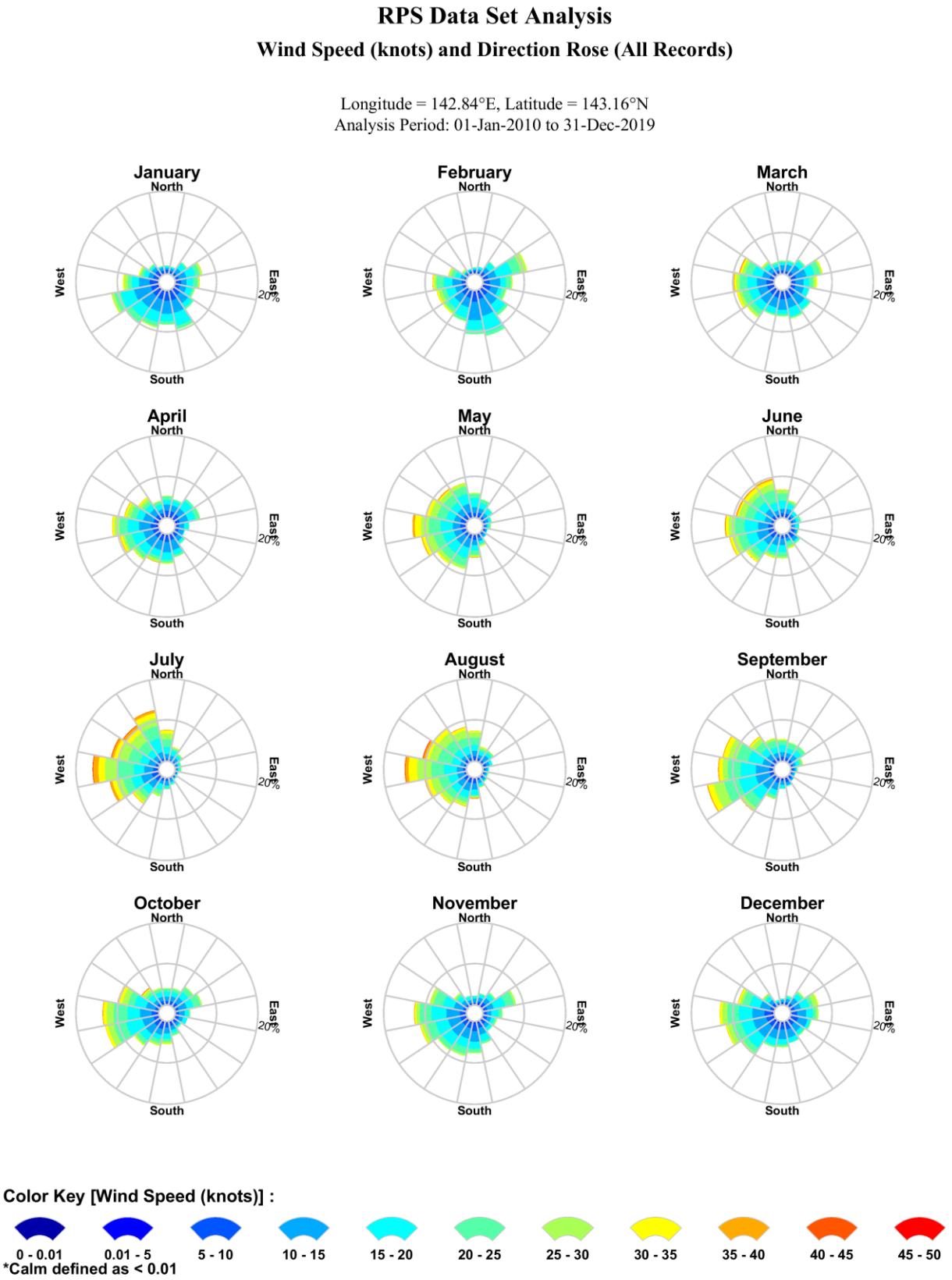

Figure 4-2 **Modelled monthly wind rose distributions from 2010–2019 (inclusive) for the node nearby the Release Location South.**

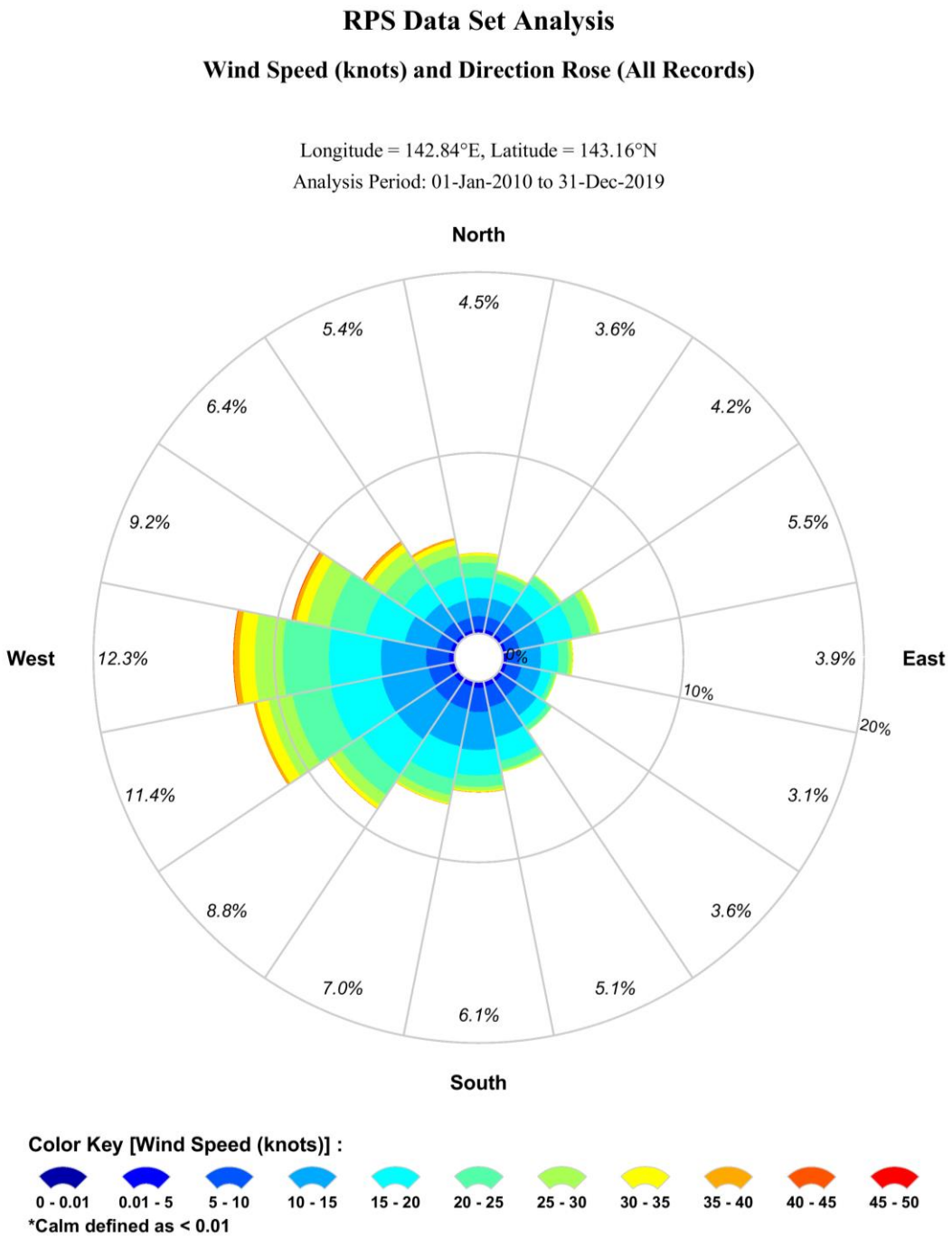

Figure 4-3 Modelled total wind rose distributions from 2010–2019 (inclusive) for the node nearby the Release Location South.

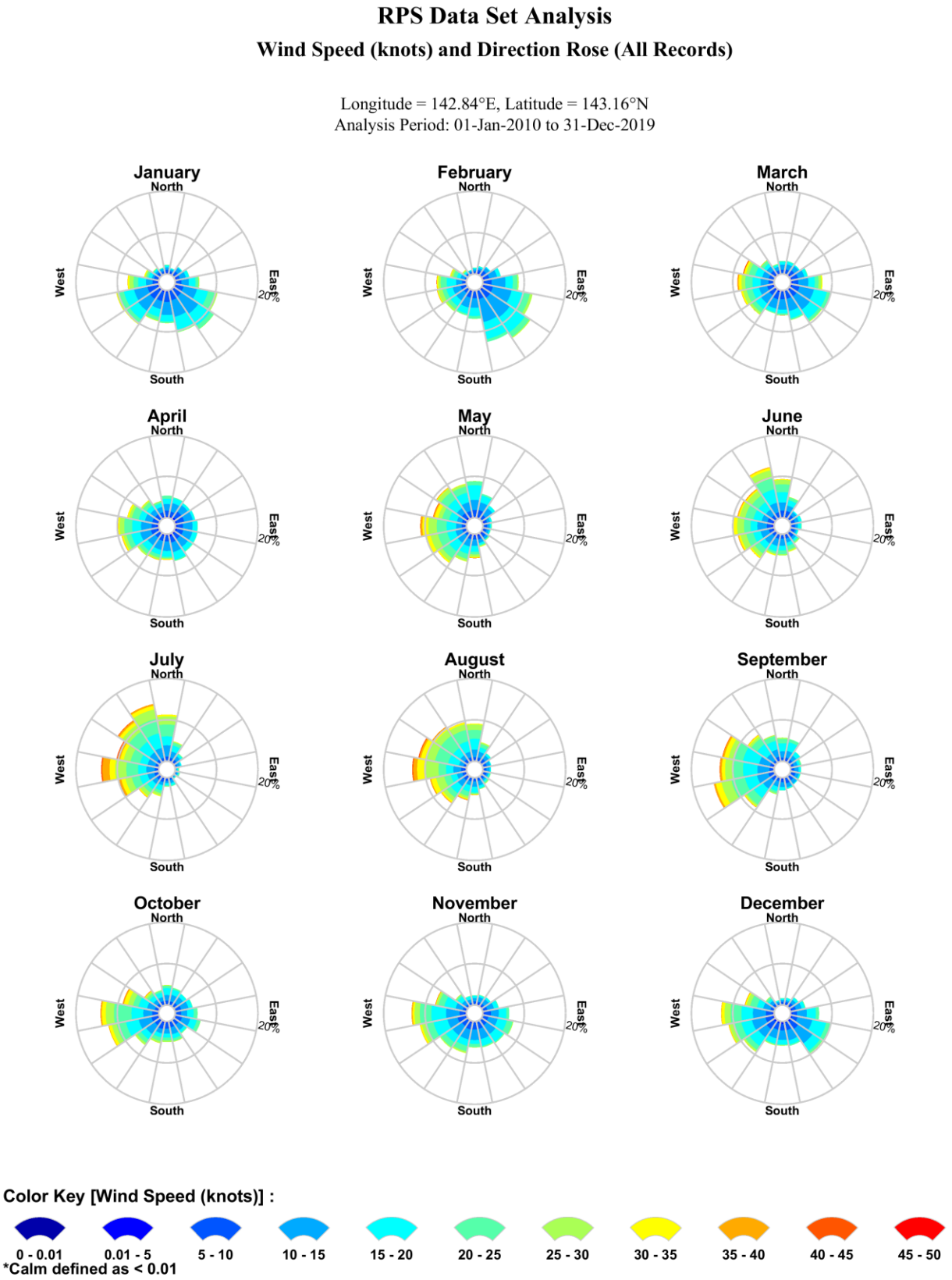

Figure 4-4 **Modelled monthly wind rose distributions from 2010–2019 (inclusive) for the node nearby the Release Location North.**

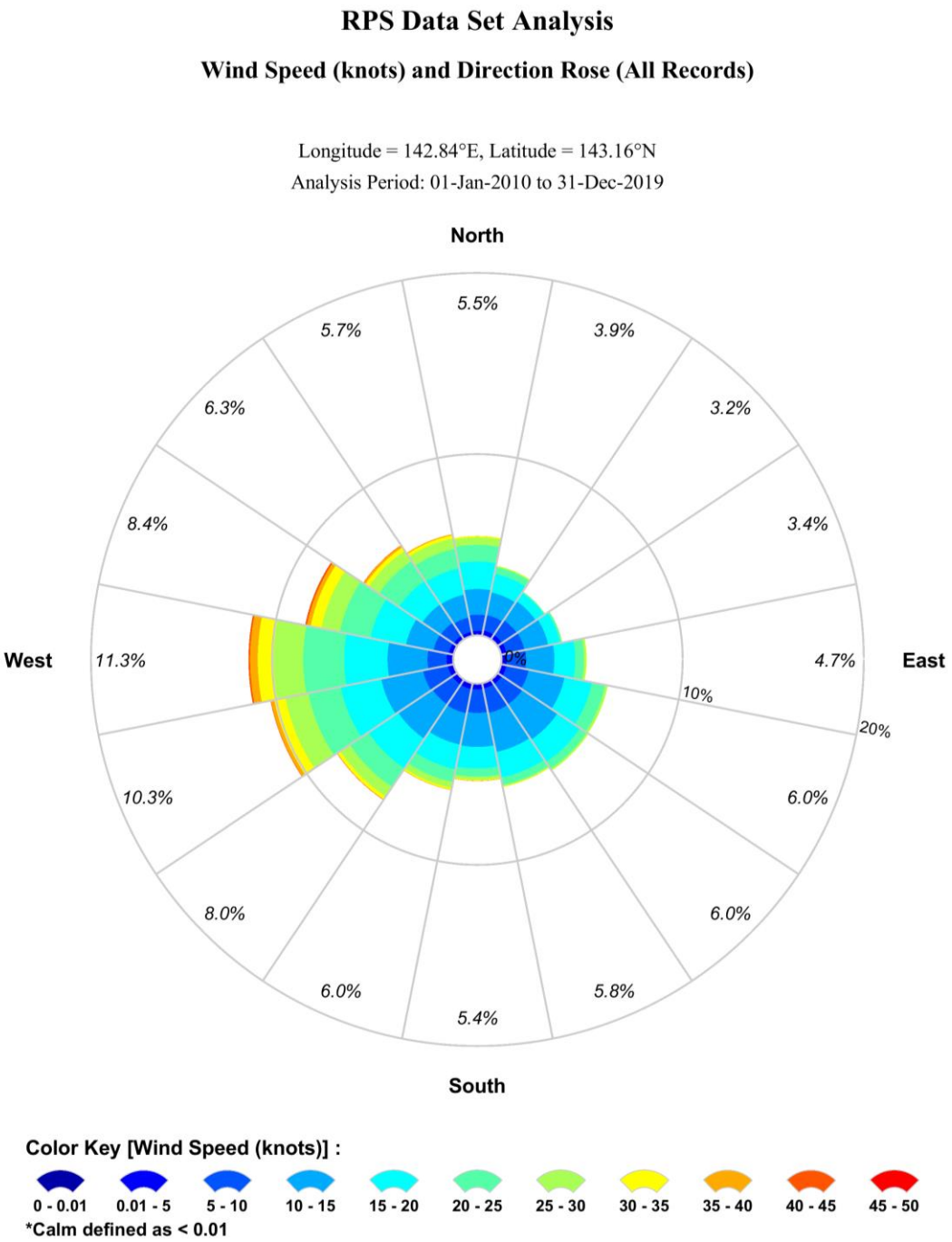

Figure 4-5 Modelled total wind rose distributions from 2010–2019 (inclusive) for the node nearby the Release Location North.

5 WATER TEMPERATURE AND SALINITY

The monthly spatially varying water temperature and salinity profiles across the model domain were obtained from the HYCOM model (Section 3.2).

Figure 5-1 and Figure 5-2 illustrate the vertical profile of sea temperature and salinity nearby the Release Location South and Release Location North, respectively.

Table 5-1 and Table 5-2 present the sea temperature and salinity of the surface layer nearby the release locations. Nearby the Release Location South, the monthly average sea surface temperatures ranged between 13.3°C (September and October) and 18.4°C (March), whilst nearby Release Location North temperatures varied from 13.5°C (September) to 19.0°C (February). The monthly average salinity values remain relatively consistent ranging between 35.3 psu and 35.4 psu nearby Release Location South and 35.3 psu and 35.5 psu nearby Release Location North.

Table 5-1 Monthly average sea surface temperature and salinity nearby the Release Location South.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperature (ºC)	17.4	18.4	18.4	17.1	15.7	15.3	14.5	13.8	13.3	13.3	14.3	15.2
Salinity (psu)	35.3	35.4	35.4	35.3	35.4	35.4	35.4	35.4	35.4	35.4	35.3	35.3

Table 5-2 Monthly average sea surface temperature and salinity nearby the Release Location North.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperature (ºC)	18.2	19.0	18.9	17.1	15.9	15.2	14.7	14.1	13.5	13.9	14.6	15.9
Salinity (psu)	35.4	35.4	35.4	35.3	35.4	35.4	35.5	35.5	35.4	35.4	35.4	35.3

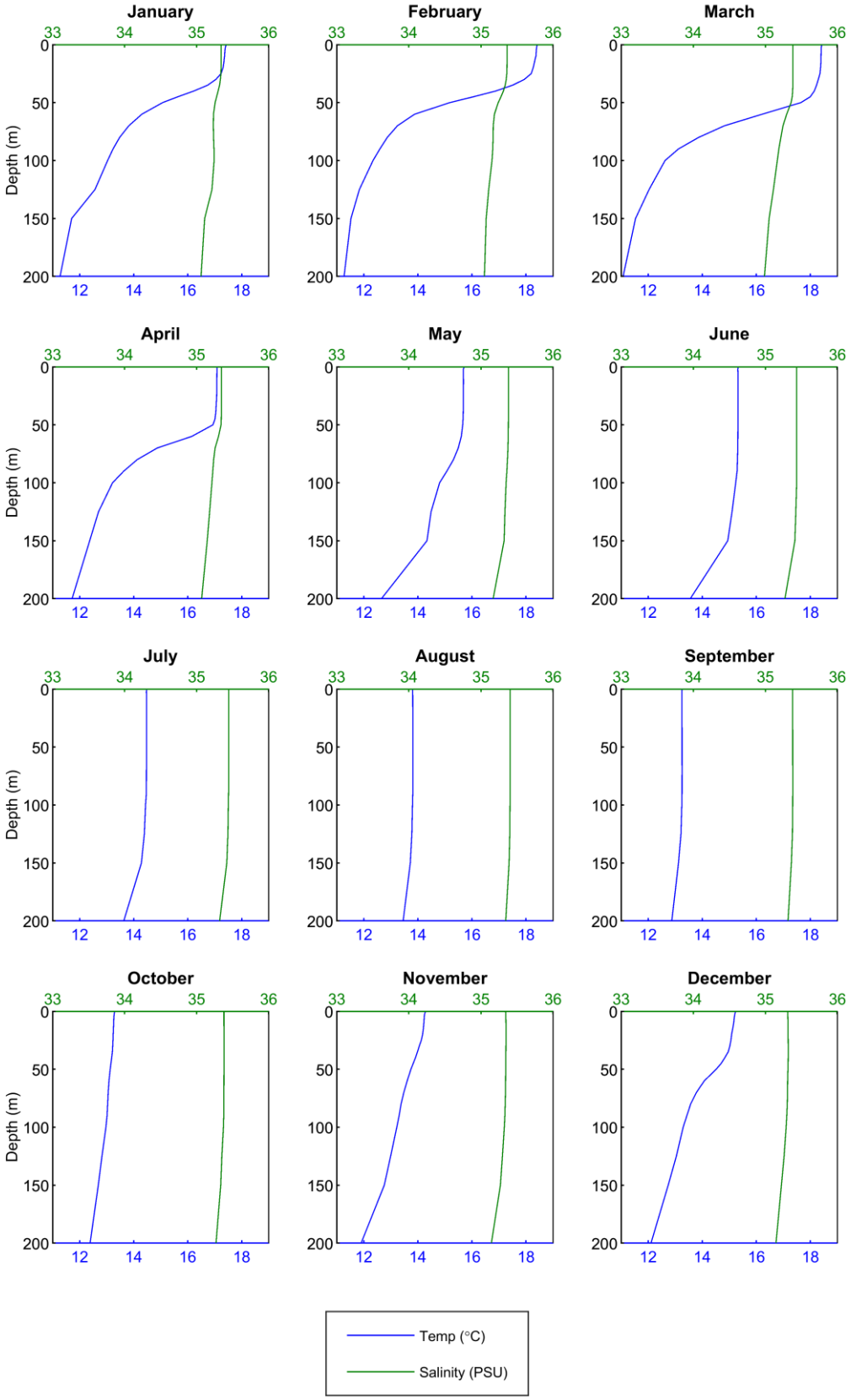

Figure 5-1 Temperature and salinity profiles nearby the Release Location South.

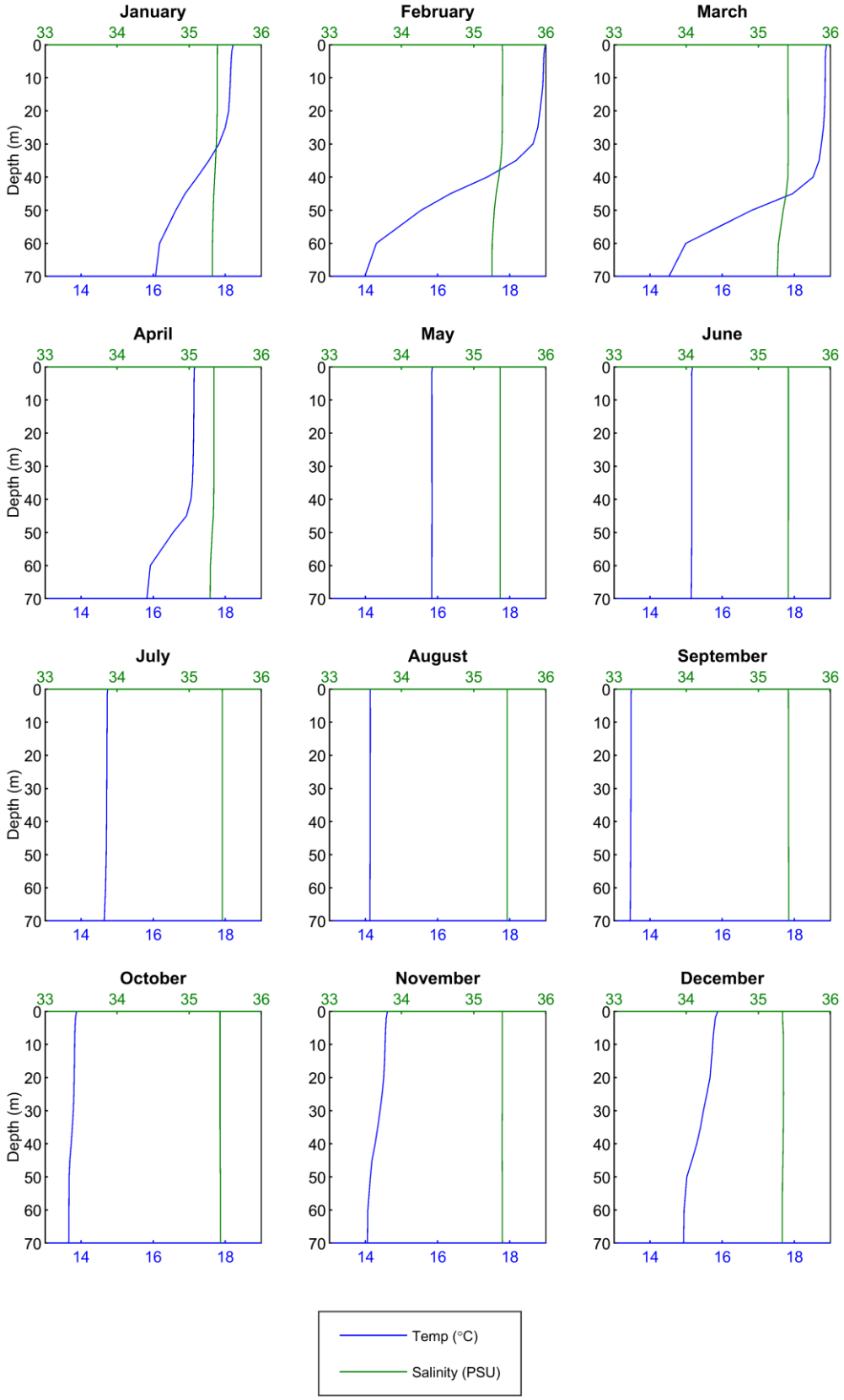

Figure 5-2 Temperature and salinity profiles nearby the Release Location North.

6 SUBSEA PLUME MODEL – OILMAP DEEP

In the event of a subsea release, the gas and condensate will initially behave like a jet, which dissipates in the water column over a short distance (<10 m). The escaping condensate shear into small droplets due to turbulence generated by passing through the exit hole and subsequent turbulence generated in the plume jet. The size-distribution of the droplets will vary with the exit velocity and viscosity of the condensate. Following this phase, the density and buoyancy difference of the gas and condensate mixture relative to the surrounding waters, forces the plume upward. As the plume rises, the volume of gas will increase due to reduction of water pressure, with gas bubbles dividing into an increasing number of bubbles due to the shearing effect exerted by the water column.

In shallow water (<200 m) the rising plume will tend to reach the sea surface before deflecting away from the centre of the plume (Spaulding et al., 2000). Figure 6-1 conceptually illustrates the various stages of a subsea release of oil and gas.

The OILMAP Deep model (Spaulding et al. 2015) was used to simulate the near-field behaviour of the gas-condensate subsea release in two phases – the initial jet phase and the buoyant plume phase. The initial jet phase is predominately driven by the exit velocity. During this phase, the condensate droplet-size-distributions are calculated for a range of classes or bins. Next, the plume model predicts the rise dynamics of the condensate and gas plume to calculate at which point gas lift will be lost (i.e., the trapping height).

Outputs which include the plume trapping height, plume diameter and droplet size distribution are used as input to the SIMAP model to simulate the rise and dispersion of the condensate droplets from this point onwards.

More details on the OILMAP-DEEP model, can be found in Spaulding et al. (2015). The model has been validated against observations from Deepwater Horizon as well as small and large-scale laboratory studies on subsurface oil releases (Brandvik et al 2013, 2014; Belore 2014; Spaulding et al. 2015; Li et al. 2017).

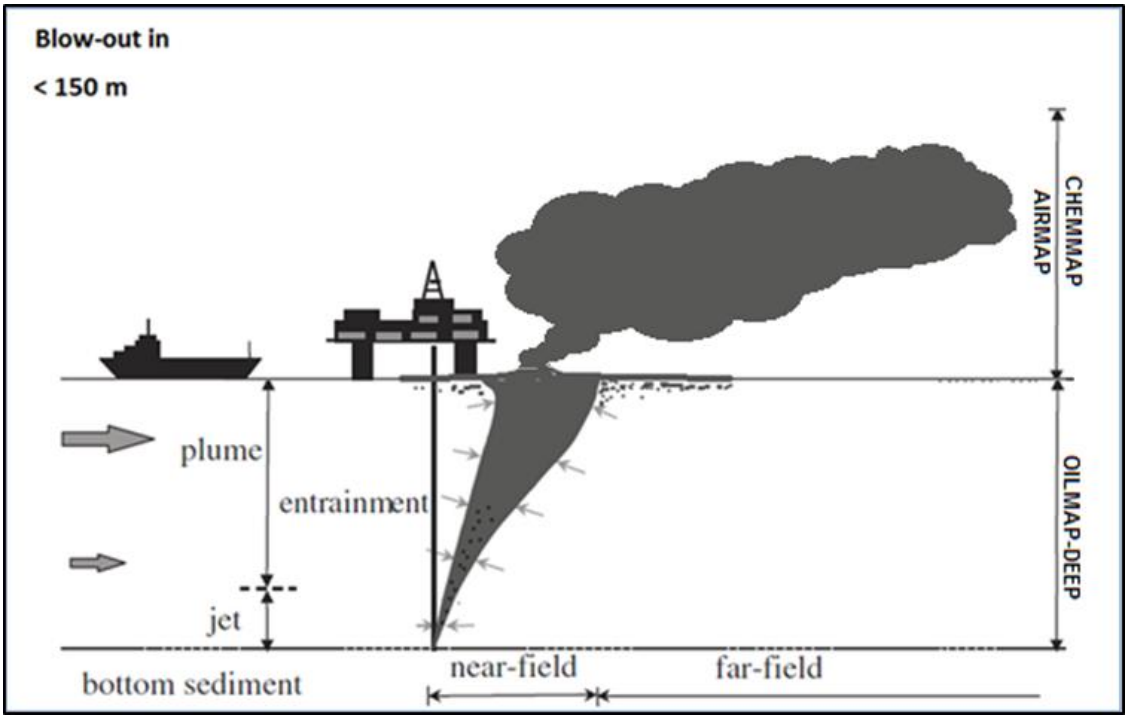

Figure 6-1 Schematic of the various stages of the plume in the water column (Source: ASA, 2011).

Table 6-1 presents the input parameters and key results for the subsea plume modelling.

The subsea modelling showed that in the event of a loss of well control at Release Location South (Scenario 1), the amalgamated gas and condensate would propel rapidly upward from the seabed and breach the sea surface. Droplet sizes would initially range from 124 µm to 537 µm on day-1 and increase in size to 141 µm to 609 µm by day-86.

The subsea modelling showed that in the event of a loss of well control at Release Location North (Scenario 3), the amalgamated gas and condensate would propel rapidly upward from the seabed and also breach the sea surface. Droplet sizes would initially range from 108 µm to 466 µm on day-1 and increase in size to 205 µm to 886 µm by day-86.

Table 6-1 Input data and key results for the subsea plume modelling.

Input Variable	Release Location South	Release Location North
Scenario	Loss of well control	Loss of well control
Water depth	155 m	71.5 m
Tubing diameter	8.5”	8.5”
Condensate discharge rate	Day-1: 7,547 STB/day Day-86: 6,652 STB/day	Day-1: 6,813 STB/day Day-86: 3,559 STB/day
Gas discharge rate	Day-1: 469 MMscf/day Day-86: 415 MMscf/day	Day-1: 407 MMscf/day Day-86: 222 MMscf/day
Formation water discharge rate	Day-1: 1,104 STB/day Day-86: 1,053 STB/day	Day-1: 363 STB/day Day-86: 266 STB/day
Key Results		
Plume execution depth (m BMSL)	0 (Breach the sea surface)	0 (Breach the sea surface)
Droplet sizes (µm)	Day-1: 124 to 537 Day-86: 141 to 609	Day-1: 108 to 466 Day-86: 205 to 886

7 OIL SPILL MODEL – SIMAP

Modelling of the fate of oil was performed using the Spill Impact Model Application Program (SIMAP). SIMAP is designed to simulate the fate and effects of spilled hydrocarbons for both the surface and subsurface releases (Spaulding et al., 1994; French et al., 1999; French-McCay, 2003, 2004; French-McCay et al., 2004).

SIMAP has been used to predict the weathering and fate of oil spills during and after major incidents including: Montara (Australia) well blowout August 2009 in the Timor Sea (Asia-Pacific ASA, 2010); Macondo (USA) well blowout April 2010 in the Gulf of Mexico; Bohai Bay (China) oil spill August 2011; and the pipeline oil spill July 2013 in the Gulf of Thailand.

The SIMAP model calculates the transport, spreading, entrainment, evaporation and decay of surface hydrocarbon slicks as well as the entrained and dissolved oil components in the water column, either from surface slicks or from oil discharged subsea. The movement and weathering of the spilled oil is calculated for specific oil types. Input specifications for oil mixtures include the density, viscosity, pour point, distillation curve (volume lost versus temperature) and the aromatic/aliphatic component ratios within given boiling point (BP) ranges.

SIMAP is a three-dimensional model that allows for various response actions to be modelled including oil removal from skimming, burning, or collection booms, and surface and subsurface dispersant application.

The SIMAP oil spill model includes advanced weathering algorithms, specifically focussed on unique oils that tend to form emulsions and/or tar balls. The weathering algorithms are based on 5 years of extensive research conducted in response to the Deepwater Horizon oil spill in the Gulf of Mexico (French-McCay et al., 2015).

Biodegradation is included in the oil spill model. In the model, SIMAP, degradation is calculated for the surface slick, deposited oil on the shore, the entrained oil and dissolved constituents in the water column, and oil in the sediments. For surface oil, water column oil and sedimented oil a first order degradation rate is specified. Biodegradation rates are relatively high for hydrocarbons in dissolved state or in dispersed small droplets.

7.1 Stochastic Modelling

For the stochastic modelling presented herein, **200 oil spills** (100 per season) were modelled for each of the 4 scenarios using the same spill information (release location, spill volume, duration and oil type) but with varied start dates per scenario. During each simulation, the model records whether any grid cells are exposed to any oil concentrations, the concentrations involved and the elapsed time before exposure. The results of all 100 oil spill simulations per season (per scenario) were analysed to determine the following statistics for every grid cell:

- Exposure load (concentrations);
- Minimum time before exposure;
- Maximum duration of exposure;
- Probability of contact above defined concentrations;
- Volume of oil that may accumulate on shorelines from any single simulation;
- Concentration that might occur on sections of individual shorelines;
- Exposure (instantaneous) to dissolved hydrocarbons in the water column;
- Exposure (instantaneous) to entrained hydrocarbons in the water column; and
- Residence time, or the longest continuous period floating oil, and dissolved and entrained hydrocarbons persisted at a point above a threshold.

7.2 Floating, Shoreline and In-Water Thresholds

The thresholds and their relationship to exposure for the sea surface, shoreline and water column (entrained and dissolved hydrocarbons) are presented in Sections 7.2.1 to 7.2.3. Supporting justifications of the adopted thresholds applied during the study and additional context relating to the area of influence are also provided. It is important to note that the thresholds herein are based on NOPSEMA (2019).

7.2.1 Floating Oil Exposure Thresholds

The modelling results can be presented to any levels; therefore, thresholds have been specified (based on scientific literature) to record floating oil exposure to the sea-surface at meaningful levels only, described in the following paragraphs.

The low threshold to assess the potential for floating oil exposure, was 1 g/m^2, which equates approximately to an average thickness of 1 µm, referred to as visible oil. Oil of this thickness is described as rainbow sheen in appearance, according to the Bonn Agreement Oil Appearance Code (Bonn Agreement, 2009; AMSA, 2014) (see Table 7-1). Figure 7-1 shows photographs highlighting the difference in appearance between a silvery sheen, rainbow sheen and metallic sheen. This threshold is considered below levels which would cause environmental harm and it is more indicative of the areas perceived to be affected due to its visibility on the sea surface and potential to trigger temporary closures of areas (i.e. fishing grounds) as a precautionary measure. Table 7-1 provides a description of the appearance in relation to exposure zone thresholds used to classify the zones of floating oil exposure.

Ecological impact has been estimated to occur at 10 g/m^2 (a film thickness of approximately 10 µm or 0.01 mm) according to French et al. (1996) and French-McCay (2009) as this level of fresh oiling has been observed to mortally impact some birds through adhesion of oil to their feathers, exposing them to secondary effects such as hypothermia. The appearance of oil at this average thickness has been described as a metallic sheen (Bonn Agreement, 2009).

Scholten et al. (1996) and Koops et al. (2004) indicated that at oil concentrations on the sea surface of 25 g/m^2 (or greater), would be harmful for all birds that have landed in an oil film due to potential contamination of their feathers, with secondary effects such as loss of temperature regulation and ingestion of oil through preening. The appearance of oil at this thickness is also described as metallic sheen (Bonn Agreement, 2009). For this study the high exposure threshold was set to 50 g/m^2 and above based on NOPSEMA (2019). This threshold can also be used to inform response planning.

Table 7-2 defines the thresholds used to classify the zones of floating oil exposure reported herein.

Table 7-1 The Bonn Agreement Oil Appearance Code.

Code	Description Appearance	Layer Thickness Interval (g/m^2 or µm)	Litres per km^2
1	Sheen (silvery/grey)	0.04 – 0.30	40 – 300
2	Rainbow	0.30 – 5.0	300 – 5,000
3	Metallic	5.0 – 50	5,000 – 50,000
4	Discontinuous True Oil Colour	50 – 200	50,000 – 200,000
5	Continuous True Oil Colour	≥ 200	≥ 200,000

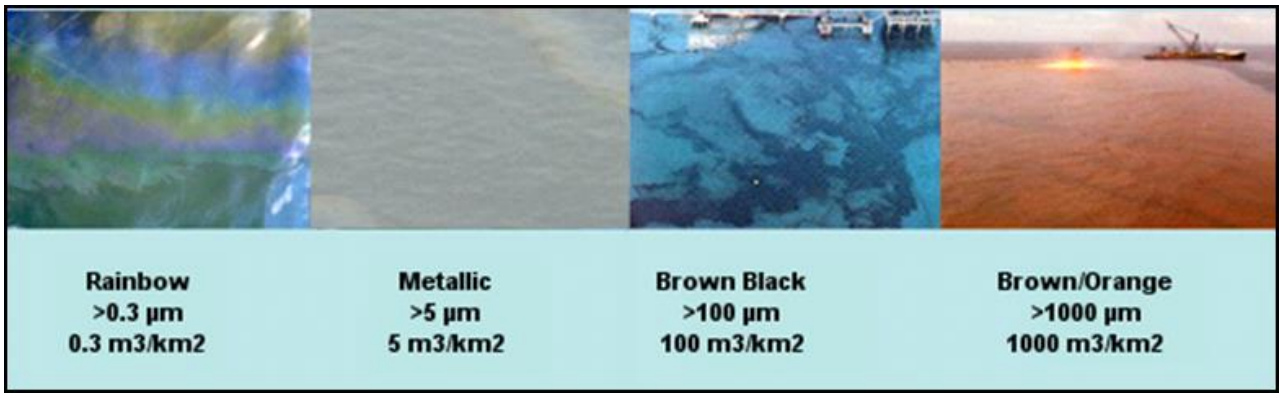

Figure 7-1 Photographs showing the difference between oil colour and thickness on the sea surface (source: adapted from Oil Spill Solutions, 2015).

Table 7-2 Floating oil exposure thresholds used in this report (in alignment with NOPSEMA, 2019).

Threshold level	Floating oil (g/m^2)	Description
Low	1	Approximates range of socioeconomic effects and establishes planning area for scientific monitoring
Moderate	10	Approximates lower limit for harmful exposures to birds and marine mammals
High	50	Approximates surface oil slick and informs response planning

7.2.2 Shoreline Accumulation Thresholds

There are many different types of shorelines, ranging from cliffs, rocky beaches, sandy beaches, mud flats and mangroves, and each of these influences the volume of oil that can remain stranded ashore and its thickness before the shoreline saturation point occurs. For instance, a sandy beach may allow oil to percolate through the sand, thus increasing its ability to hold more oil ashore over tidal cycles and various wave actions than an equivalent area of water; hence oil can increase in thickness onshore over time. A sandy beach shoreline was assumed as the default shoreline type for the modelling herein, as it allows for the highest carrying capacity of oil (of the available open/exposed shoreline types). Hence the results contained herein would be indicative of a worst-case scenario, where the highest volume of oil may be stranded on the shoreline (when compared to other shoreline types, such as exposed rocky shores).

In previous risk assessment studies, French-McCay et al. (2005a; 2005b) used a threshold of 10 g/m^2 to assess the potential for shoreline accumulation. This is a conservative threshold used to define regions of socio-economic impact, such as triggering temporary closures of adjoining fisheries or the need for shore clean-up on beaches or man-made features/amenities (breakwaters, jetties, marinas, etc.). It would equate to approximately 2 teaspoons of hydrocarbon per square meter of shoreline accumulation. The appearance is described as a stain/film. On that basis, the 10 g/m^2 shoreline accumulation threshold has been selected to define the zone of potential “low shoreline accumulation”.

French et al. (1996) and French-McCay (2009) define a shoreline oil accumulation threshold of 100 g/m^2, or above, would potentially harm shorebirds and wildlife (furbearing aquatic mammals and marine reptiles on or along the shore) based on studies for sub-lethal and lethal impacts. This threshold has been used in previous environmental risk assessment studies (see French-McCay, 2003; French-McCay et al., 2004, French-McCay et al., 2011; 2012; NOAA, 2013). Additionally, a shoreline concentration of 100 g/m^2, or above, is the minimum limit that the oil can be effectively cleaned according to the AMSA (2015) guideline. This threshold equates to approximately ½ a cup of oil per square meter of shoreline accumulation. The appearance is described as a thin oil coat. Therefore, 100 g/m^2 has been selected to define the zone of potential “moderate shoreline accumulation”.

Observations by Lin & Mendelssohn (1996) demonstrated that loadings of more than 1,000 g/m^2 of hydrocarbon during the growing season would be required to impact marsh plants significantly. Similar thresholds have been found in studies assessing hydrocarbon impacts on mangroves (Grant et al., 1993; Suprayogi & Murray, 1999). Hence, 1,000 g/m^2 has been selected to define the zone of potential “high

shoreline accumulation". It equates to approximately 1 litre of hydrocarbon per square meter of shoreline accumulation. The appearance is described as a hydrocarbon cover.

It is worth noting that the shoreline accumulation thresholds derived from extensive literature review (outlined in Table 7-3) agree with the commonly used threshold values for oil spill modelling specified in NOPSEMA (2019).

Table 7-3 Thresholds used to assess shoreline accumulation.

Threshold level	Shoreline loading (g/m^2)	Description
Low (socioeconomic/sublethal)	10	Predicts potential for some socio-economic impact
Moderate	100	Loading predicts area likely to require clean-up effort
High	> 1,000	Loading predicts area likely to require intensive clean-up effort

7.2.3 In-water Exposure Thresholds

Oil is a mixture of thousands of hydrocarbons of varying physical, chemical, and toxicological characteristics, and therefore, demonstrate varying fates and impacts on organisms. As such, for in-water exposure, the SIMAP model provides separate outputs for dissolved and entrained hydrocarbons from oil droplets. The consequences of exposure to dissolved and entrained components will differ because they have different modes and magnitudes of effect.

Entrained hydrocarbon concentrations were calculated based on oil droplets that are suspended in the water column, though not dissolved. The composition of this oil would vary with the state of weathering (oil age) and may contain soluble hydrocarbons when the oil is fresh. Calculations for dissolved hydrocarbons specifically calculates oil components which are dissolved in water, which are known to be the primary source of toxicity exerted by oil.

In addition to presenting the maximum instantaneous concentrations across the model domain, there are also figures presented for the residence time, which is the longest continuous period of exposure above each threshold. This helps provide context when considering exposure to sensitive receptors.

7.2.3.1 Dissolved Hydrocarbons

Laboratory studies have shown that dissolved hydrocarbons exert most of the toxic effects of oil on aquatic biota (Carls et al., 2008; Nordtug et al., 2011; Redman, 2015). The mode of action is a narcotic effect, which is positively related to the concentration of soluble hydrocarbons in the body tissues of organisms (French-McCay, 2002). Dissolved hydrocarbons are taken up by organisms directly from the water column by absorption through external surfaces and gills, as well as through the digestive tract. Thus, soluble hydrocarbons are termed "bioavailable".

Hydrocarbon compounds vary in water-solubility and the toxicity exerted by individual compounds is inversely related to solubility, however bioavailability will be modified by the volatility of individual compounds (Nirmalakhandan & Speece, 1988; Blum & Speece, 1990; McCarty, 1986; McCarty et al., 1992a, 1992b; Mackay et al., 1992; McCarty & Mackay, 1993; Verhaar et al., 1992, 1999; Swartz et al., 1995; French-McCay, 2002; McGrath and Di Toro, 2009). Of the soluble compounds, the greatest contributor to toxicity for water-column and benthic organisms are the lower-molecular-weight aromatic compounds, which are both volatile and soluble in water. Although they are not the most water-soluble hydrocarbons within most oil types, the polynuclear aromatic hydrocarbons (PAHs) containing 2-3 aromatic ring structures typically exert the largest narcotic effects because they are semi-soluble and not highly volatile, so they persist in the environment long enough for significant accumulation to occur (Anderson et al., 1974, 1987; Neff & Anderson, 1981; Malins & Hodgins, 1981; McAuliffe, 1987; NRC, 2003). The monoaromatic hydrocarbons (MAHs), including the BTEX compounds (benzene, toluene, ethylbenzene, and xylenes), and the soluble alkanes (straight chain hydrocarbons) also contribute to toxicity, but these compounds are highly volatile, so that their contribution will be low when oil is exposed to evaporation and higher when oil is discharged at depth where volatilisation does not occur (French-McCay, 2002).

French-McCay (2002) reviewed available toxicity data, where marine biota was exposed to dissolved hydrocarbons prepared from oil mixtures, finding that 95% of species and life stages exhibited 50% population mortality (LC_{50}) between 6 and 400 ppb total PAH concentration after 96 hrs exposure, with an average of 50 ppb. Hence, concentrations lower than 6 ppb total PAH value should be protective of 97.5% of species and life stages even with exposure periods of days (at least 96 hours). Early life-history stages of fish appear to be more sensitive than older fish stages and invertebrates.

Exceedances of 10, 50 or 400 ppb over a 1-hour timestep (see Table 7-4) was applied to indicate increasing potential for sub-lethal to lethal toxic effects (or low to high), based on NOPSEMA (2019).

7.2.3.2 Entrained Hydrocarbons

Entrained hydrocarbons consist of oil droplets that are suspended in the water column and insoluble. As such, insoluble compounds in oil cannot be absorbed from the water column by aquatic organisms, hence are not bioavailable through absorption of compounds from the water. Exposure to these compounds would require routes of uptake other than absorption of soluble compounds. The route of exposure of organisms to whole oil alone include direct contact with tissues of organisms and uptake of oil by direct consumption, with potential for biomagnification through the food chain (NRC, 2005).

The 10 ppb threshold represents the very lowest concentration and corresponds generally with the lowest trigger levels for chronic exposure for entrained hydrocarbons in the ANZECC & ARMCANZ (2000) water quality guidelines. Due to the requirement for relatively long exposure times (> 24 hours) for these concentrations to be significant, they are likely to be more meaningful for juvenile fish, larvae and planktonic organisms that might be entrained (or otherwise moving) within the entrained plumes, or when entrained hydrocarbons adhere to organisms or trapped against a shoreline for periods of several days or more.

This exposure zone is not considered to be of significant biological impact and is therefore outside the adverse exposure zone. This exposure zone represents the area contacted by the spill. This area does not define the area of influence as it is considered that the environment will not be affected by the entrained hydrocarbon at this level.

Thresholds of 10 ppb and 100 ppb were applied over a 1-hour time exposure (Table 7-4), to cover the range of thresholds outlined in ANZECC & ARMCANZ (2000) water quality guidelines, the incremental change for greater potential effect and is per NOPSEMA (2019).

A complicating factor that should be considered when assessing the consequence of dissolved and entrained oil distributions is that there will be some areas where both physically entrained oil droplets and dissolved hydrocarbons co-exist. Higher concentrations of each will tend to occur close to the source where sea conditions can force mixing of relatively unweathered oil into the water column, resulting in more rapid dissolution of soluble compounds.

Table 7-4 Dissolved and entrained hydrocarbon exposure values assessed over a 1-hour time step, as per NOPSEMA (2019).

Threshold level	Dissolved hydrocarbon concentration (ppb)	Entrained hydrocarbon concentrations (ppb)
Low	10	10
Moderate	50	-
High	400	100

8 OIL PROPERTIES

8.1 Oil Characteristics

Table 8-1 and Table 8-2 present the physical properties and boiling point ranges of Marine Diesel and Thylacine condensate, which was used as the proxy for the study.

Thylacine condensate has an API of 44.3 and a density of 804.6 kg/m^3 (at 15ºC) with a viscosity value (0.87.0 cP) classifying it as a Group I (not-persistent) oil according to the International Tankers Owners Pollution Federation (ITOPF, 2020) and US EPA/USCG classifications.

The condensate is a mixture of volatile and persistent hydrocarbons with high proportions of volatile and semi- to low-volatile components. In favourable evaporation conditions, about 64.0% of the oil mass should evaporate within the first 12 hours (BP < 180°C), a further 19.0% should evaporate within the first 24 hours (180°C < BP < 265°C) and a further 16.0% should evaporate over several days (265°C < BP < 380°C). Approximately 1.0% of the oil is shown to be persistent.

Marine diesel (MDO) has an API of 37.6 and a density of 829.1 kg/m^3 (at 25ºC) with a viscosity value (4.0 cP) classifying it as a Group II (light-persistent) oil according to the International Tankers Owners Pollution Federation (ITOPF, 2020) and US EPA/USCG classifications.

The MDO is a mixture of volatile and persistent hydrocarbons with high proportions of volatile and semi- to low-volatile components. In favourable evaporation conditions, about 6.0% of the oil mass should evaporate within the first 12 hours (BP < 180°C); a further 34.6% should evaporate within the first 24 hours (180°C < BP < 265°C); and a further 54.4% should evaporate over several days (265°C < BP < 380°C). Approximately 5.0% of the oil is shown to be persistent.

Table 8-1 Physical properties for Thylacine condensate.

Characteristic	Thylacine Condensate	MDO
Density (kg/m^3)	804.6 (at 15°C)	829.1 (at 25 °C)
API	44.3	37.6
Dynamic viscosity (cP)	0.87 (at 20°C)	4.0 (at 25 °C)
Pour point (°C)	-50	-14
Hydrocarbon property category	Group I	Group II
Hydrocarbon property classification	Not – Persistent	Light - Persistent

Table 8-2 Boiling point ranges for Thylacine condensate.

Oil Type	Component	Volatile (%)	Semi-volatile (%)	Low-volatile (%)	Residual (%)
	Boiling point (°C)	<180 C_4 to C_{10}	180-265 C_{11} to C_{15}	265-380 C_{16} to C_{20}	>380 >C_{20}
Thylacine Condensate	% of total	64.0	19.0	16.0	1.0
Marine Diesel	% of total	6.0	34.6	54.4	5.0

The BP are dictated by the length of the carbon chains, with the longer and more complex compounds having a higher boiling point, and therefore lower volatility and evaporation rate.

Typical evaporation times once the hydrocarbons reach the surface and are exposed to the atmosphere are:

- Up to 12 hours for the C_4 to C_{10} compounds (or <180°C BP).
- Up to 24 hours for the C_{11} to C_{15} compounds (180–265°C BP).
- Several days for the C_{16} to C_{20} compounds (265–380°C BP).
- Not applicable for the residual compounds (BP >380°C), which will resist evaporation, persist in the marine environment for longer periods, and be subject to relatively slow degradation.

The actual fate of oil will depend greatly on the amount that reaches the surface.

8.2 Weathering Characteristics

A series of model weather tests were conducted to illustrate the potential behaviour of Thylacine condensate and marine diesel when exposed to idealised and representative environmental conditions:

- A 50 m^3 surface release over 1-hour under calm wind conditions (constant 5 knots or 2.6 m/s), assuming low seasonal water temperature (15°C) and ambient tidal and drift currents; and
- A 50 m^3 surface release over 1-hour under variable wind conditions (1-12 knots or 1.9-23 m/s, drawn from representative data files), assuming low seasonal water temperature (15°C) and ambient tidal and drift currents.

Note, a surface release is used in the weathering test to solely focus on the weathering and fates of the hydrocarbons when exposed to atmospheric conditions.

The first case is indicative conditions that would not generate entrainment, while the second case may represent conditions that could cause a minor degree of entrainment. Both scenarios provide examples of potential behaviour during a spill once the oil reaches the surface.

Thylacine Condensate Mass Balance Forecasts

The mass balance for the condensate under the constant 5 knot wind case (Figure 8-1) shows that 82.5% of the oil is predicted to evaporate within 24 hours. Under calm conditions, the majority of the remaining oil on the water surface will weather at a slower rate due to being comprised of the longer-chain compounds with higher boiling points. Evaporation shall cease when the residual compounds remain, and they will be subject to more gradual decay through biological and photochemical processes.

Under the variable-wind case (Figure 8-2), where the winds are of greater strength on average, entrainment of the condensate into the water column is predicted to increase. Approximately 24 hours after the spill, 22.1% of the oil mass is forecast to have entrained and a further 69.4% is forecast to have evaporated, leaving only a small proportion of the oil floating on the water surface (<0.1%).

The increased level of entrainment in the variable-wind case result in a higher percentage decaying at an approximate rate of 1.9% per day with or ~10.9% after 7 days, compared to <0.1% per day and a total of 0.8% after 7 days for the constant-wind case. Given the proportion of entrained oil and the tendency for it to remain mixed in the water column, the remaining hydrocarbons will decay over time scales of several weeks.

Marine Diesel Mass Balance Forecasts

The mass balance for the MDO under the constant 5 knot (~2.5 m/s) wind case (Figure 8-3) shows that 40.3% of the oil is predicted to evaporate within 24 hours. Under calm conditions, the majority of the remaining oil on the water surface will weather at a slower rate due to being comprised of the longer-chain compounds with higher boiling points. Evaporation shall cease when the residual compounds remain, and they will be subject to more gradual decay through biological and photochemical processes.

Under the variable-wind case (Figure 8-4), where the winds are of greater strength on average, entrainment of MDO into the water column is predicted to increase. Approximately 24 hours after the spill, 60.1% of the oil mass is forecast to have entrained and a further 38.4% is forecast to have evaporated, leaving only a small proportion of the oil floating on the water surface (<0.1%).

The increased level of entrainment in the variable-wind case result in a higher percentage decaying at an approximate rate of 1.5% per day with or ~10.5% after 7 days, compared to <0.1% per day and a total of 0.9% after 7 days for the constant-wind case. Given the proportion of entrained oil and the tendency for it to remain mixed in the water column, the remaining hydrocarbons will decay over time scales of several weeks.

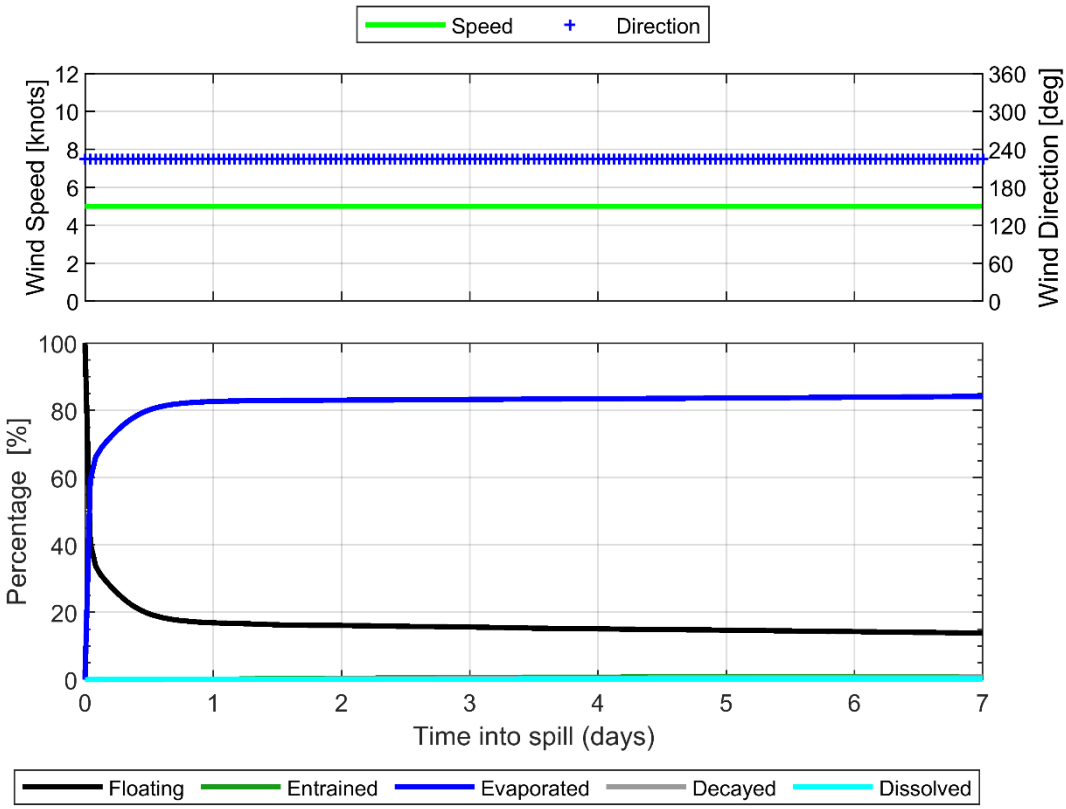

Figure 8-1 Proportional mass balance plot representing the weathering of Thylacine condensate spilled onto the water surface over 1 hour and subject to a constant 5 knots (2.6 m/s) wind speed at 15°C water temperature.

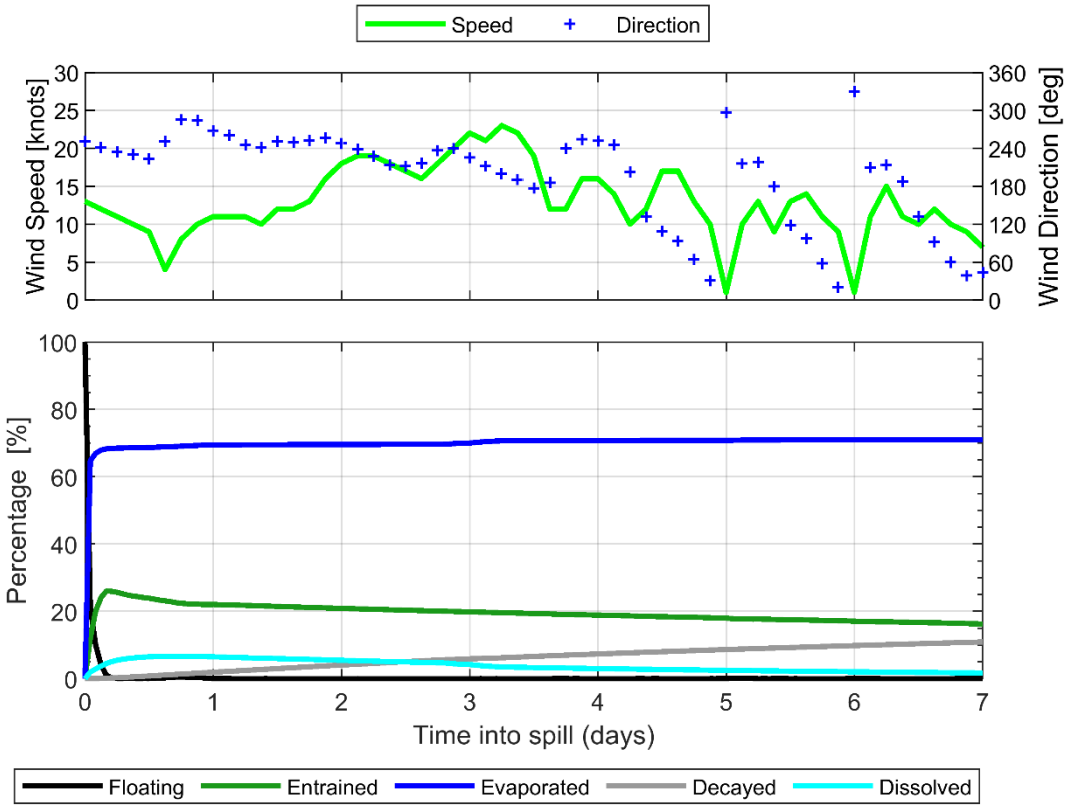

Figure 8-2 Proportional mass balance plot representing the weathering of Thylacine condensate spilled onto the water over 1 hour and subject to variable wind speeds (1-12 knots or 1.9-23 m/s) at 15°C water temperature.

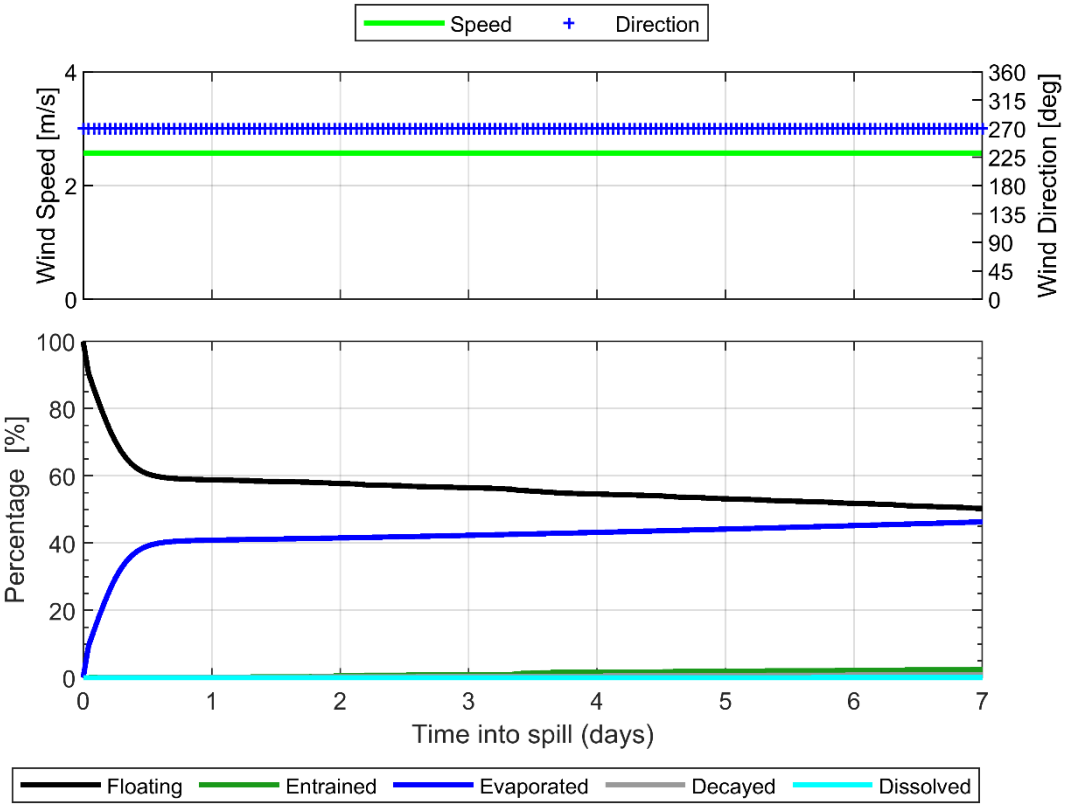

Figure 8-3 Proportional mass balance plot representing the weathering of MDO spilled onto the water surface over 1 hour and subject to a constant 5 knots (2.6 m/s) wind speed at 15°C water temperature.

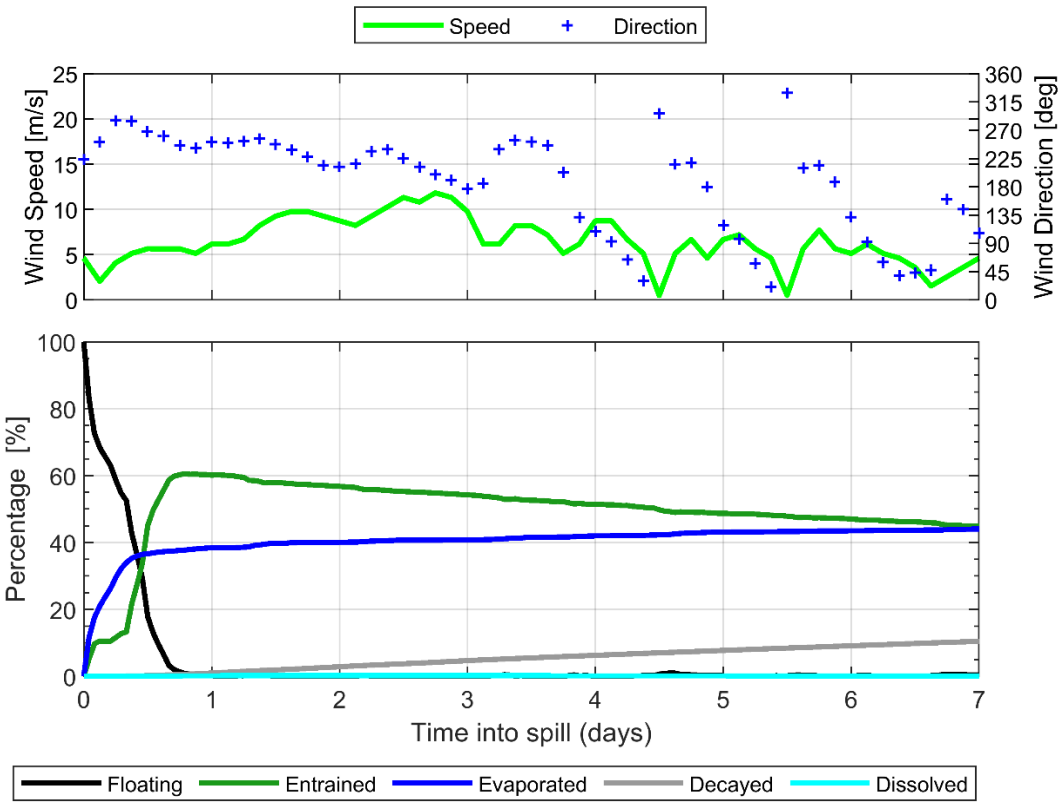

Figure 8-4 Proportional mass balance plot representing the weathering of MDO spilled onto the water over 1 hour and subject to variable wind speeds (1-12 knots) at 15°C water temperature.

9 OIL SPILL SCENARIOS

Table 9-1 provides a summary of the oil spill model settings.

Table 9-1 Summary of the oil spill model settings and thresholds used in this assessment.

Parameter	Release Location South	Release Location South	Release Location North	Release Location North
Description	Loss of well control	Loss of containment	Loss of well control	Loss of containment
Number of randomly selected spill start times	100 per season	100 per season	100 per season	100 per season
Model period	Summer (November through to March) and Winter (April to October)			
Oil type	Thylacine condensate	Marine Diesel	Thylacine condensate	Marine Diesel
Spill volume	97,171.8 m3	603.7 m^3	69,120.0 m^3	603.7 m^3
Release type	Subsea (155 m)	Surface	Subsea (71.5 m)	Surface
Release duration	86 days (variable release rate)	6 hours	86 days (variable release rate)	6 hours
Simulation length	100 days	30 days	100 days	30 days
Surface oil concentration thresholds (g/m^2)^	1 (low); 10 (moderate); 50 (high)			
Shoreline oil accumulation thresholds (g/m^2)^	10 (low); 100 (moderate); 1,000 (high)			
Dissolved hydrocarbon concentrations (ppb)^	10 (low); 50 (moderate); 400 (high)			
Entrained hydrocarbon concentrations (ppb)^	10 (low); 100 (high)			

^Thresholds based on NOPSEMA (2019)

10 PRESENTATION AND INTERPRETATION OF MODEL RESULTS

The results from the modelling study are presented in a number of tables and figures, which aim to provide an understanding of the predicted sea-surface and water column (subsurface) exposure and shoreline accumulation (if predicted).

10.1 Annual Analysis

10.1.1 Statistics

The statistics are based on the following principles:

- The ***greatest distance travelled by a spill trajectory*** – is determined by a) recording the maximum and b) second greatest distance travelled (or 99th percentile) by a single trajectory, within a scenario, from the release location to the identified exposure thresholds.

- The ***probability of oil exposure to a receptor*** – is determined by recording the number of spill trajectories to reach a specified sea surface or subsea threshold within a receptor polygon, divided by the total number of spill trajectories within that scenario.

- The ***minimum time before oil exposure to a receptor*** – is determined by ranking the elapsed time before sea surface exposure, at a specified threshold, to grid cells within a receptor polygon and recording the minimum value.

- The ***maximum residence time for oil exposure within a receptor*** – is determined by recording the longest continuous length of time a grid cell is exposed to either floating, entrained or dissolved hydrocarbon above each threshold, within a receptor.

- The ***probability of oil accumulation at a receptor*** – is determined by recording the number of spill trajectories to reach a specified shoreline accumulation threshold within a receptor polygon, divided by the total number of spill trajectories within that scenario.

- The ***maximum potential oil loading within a receptor*** – is determined by identifying the maximum loading to any grid cell within a receptor polygon, for a scenario.

- The ***dissolved and entrained hydrocarbon exposure*** – is determined by recording the maximum instantaneous concentrations at each grid cell.

- ***Maximum total volume ashore*** (found in shoreline statistics table) – Is the total volume of oil stranded on the shorelines throughout the duration of the simulation.

- ***Maximum instantaneous peak volume ashore*** (found in the deterministic analysis section and derived from the histogram) – Is the peak volume of oil accumulated on shorelines at a single point in time. This peak value does not include oil that came ashore earlier in the simulation and was subsequently lost through evaporation or other weathering processes.

10.2 Receptors Assessed

A range of environmental receptors and shorelines were assessed for floating oil exposure, shoreline accumulation and water column exposure as part of the study (see Figure 10-1 to Figure 10-11). Receptor categories (see Table 10-1) include sections of shorelines which are defined by local government areas (LGAs), sub-LGAs and offshore islands. All other sensitive receptors other than submerged reefs, shoals and banks (RSB) were sourced from Australian Government Department of Climate Change, Energy, the Environment and Water (http://www.environment.gov.au/).

Risks of exposure were separately calculated for each sensitive receptor area and have been tabulated.

Table 10-3 summarises the receptors that the release location resides within.

Table 10-1 Summary of receptors used to assess floating oil, shoreline and in-water exposure to hydrocarbons.

Receptor Category	Acronym	Hydrocarbon Exposure Assessment			Figure reference
		Water Column	Floating oil	Shoreline	
Australian Marine Park	AMP	✓	✓	×	Figure 10-1
Integrated Marine and Coastal Regionalisation Areas	IMCRA	✓	✓	×	Figure 10-2
Marine National Park	MNP	✓	✓	×	Figure 10-3
Marine Park	MP	✓	✓	×	Figure 10-4
Nature Reserve	NR	✓	✓	×	Figure 10-5
Ramsar	Ramsar	✓	✓	✓	Figure 10-6
Reefs, Shoals and Banks	RSB	✓	✓	×	Figure 10-7
Key Ecological Feature	KEF	✓	✓	×	Figure 10-8
State Waters	State Waters	✓	✓	×	
Local Government Areas	LGA	✓ (Reported as: Nearshore Waters)	✓ (Reported as: Nearshore Waters)	✓ (Reported as: Shore)	Figure 10-9 to Figure 10-11

Table 10-2 Summary of the receptors that the Release Location South resides within.

Receptor Type	Receptor Name
BIA	Antipodean Albatross – Foraging
	Black-browed Albatross – Foraging
	Buller's Albatross – Foraging
	Campbell Albatross – Foraging
	Common Diving-petrel – Foraging
	Indian Yellow-nosed Albatross – Foraging
	Pygmy Blue Whale – Distribution
	Pygmy Blue Whale - Foraging
	Pygmy Blue Whale - Foraging (annual high use area)
	Short-tailed Shearwater – Foraging
	Shy Albatross – Foraging
	Southern Right Whale - Known Core Range
	Wandering Albatross – Foraging
	Wedge-tailed Shearwater – Foraging

	White Shark – Distribution
IMCRA	Otway

Table 10-3 Summary of the receptors that the Release Location North resides within.

Receptor Type	Receptor Name
BIA	Antipodean Albatross – Foraging
	Black-browed Albatross – Foraging
	Buller's Albatross – Foraging
	Campbell Albatross – Foraging
	Common Diving-petrel – Foraging
	Indian Yellow-nosed Albatross – Foraging
	Pygmy Blue Whale – Distribution
	Pygmy Blue Whale - Foraging (annual high use area)
	Shy Albatross – Foraging
	Southern Right Whale - Known Core Range
	Wandering Albatross – Foraging
	Wedge-tailed Shearwater – Foraging
	White Shark – Distribution
IMCRA	Otway

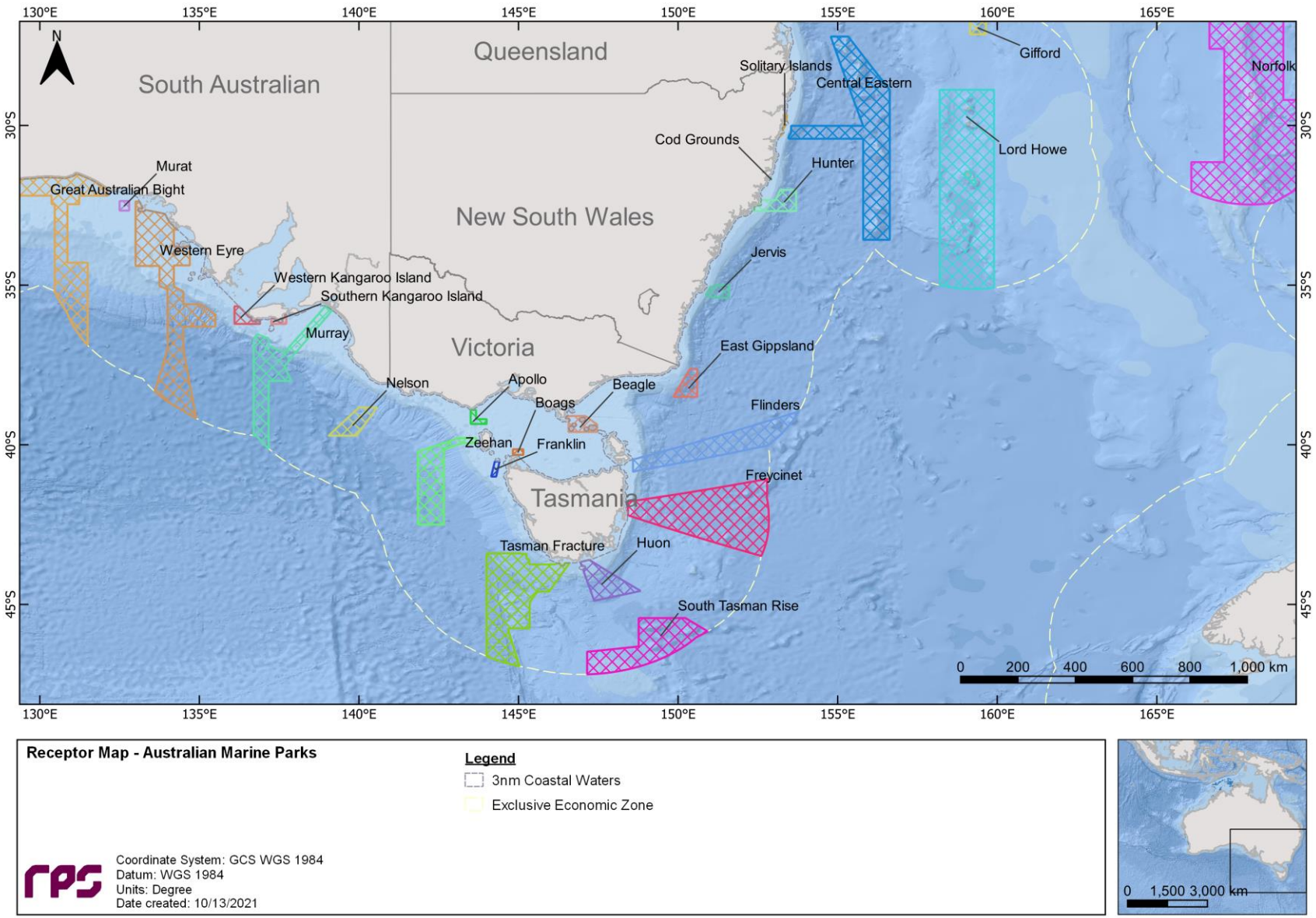

Figure 10-1 Receptor map for Australian Marine Parks (AMP).

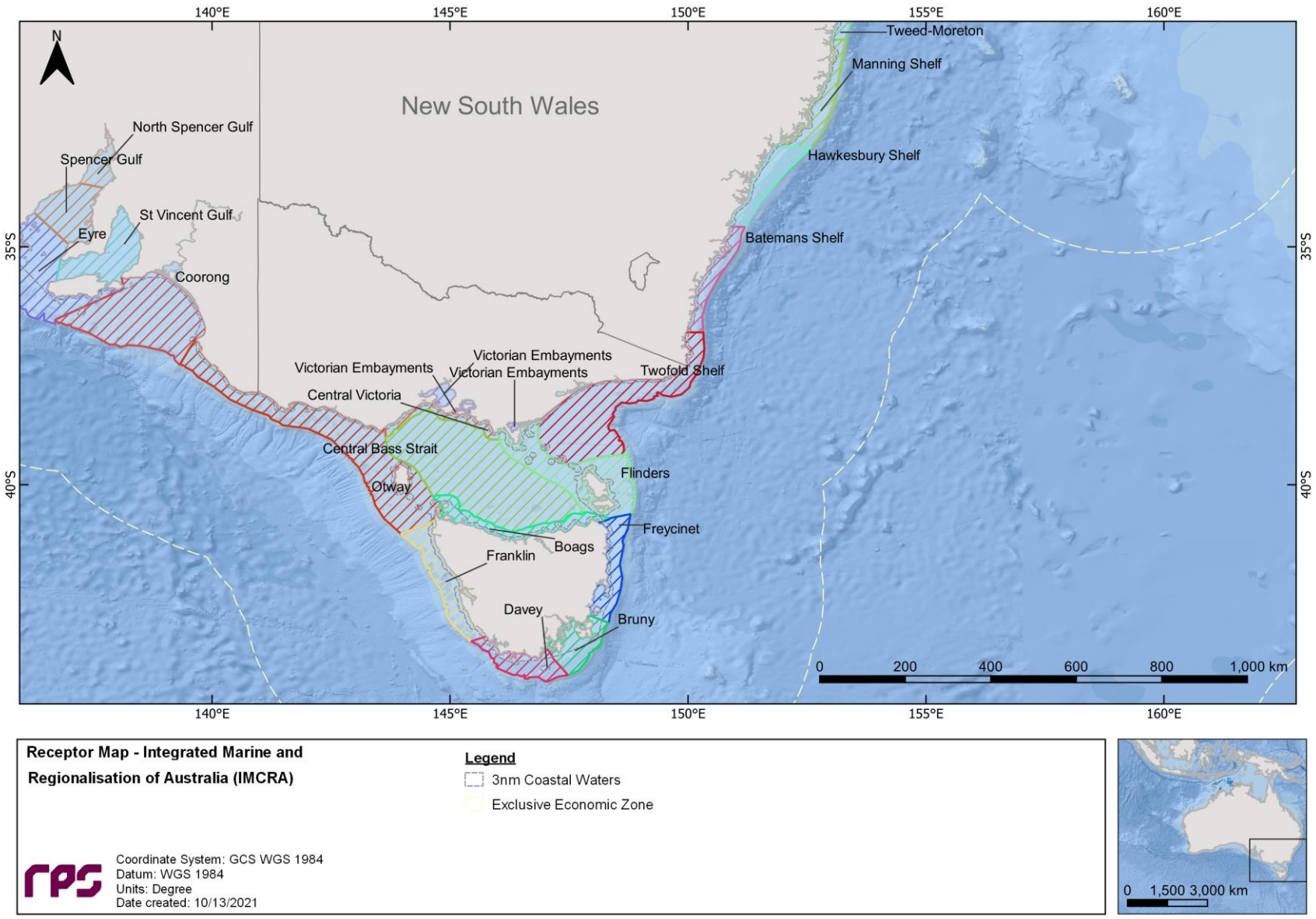

Figure 10-2 Receptor map for integrated marine and coastal regionalisation (IMCRA) areas.

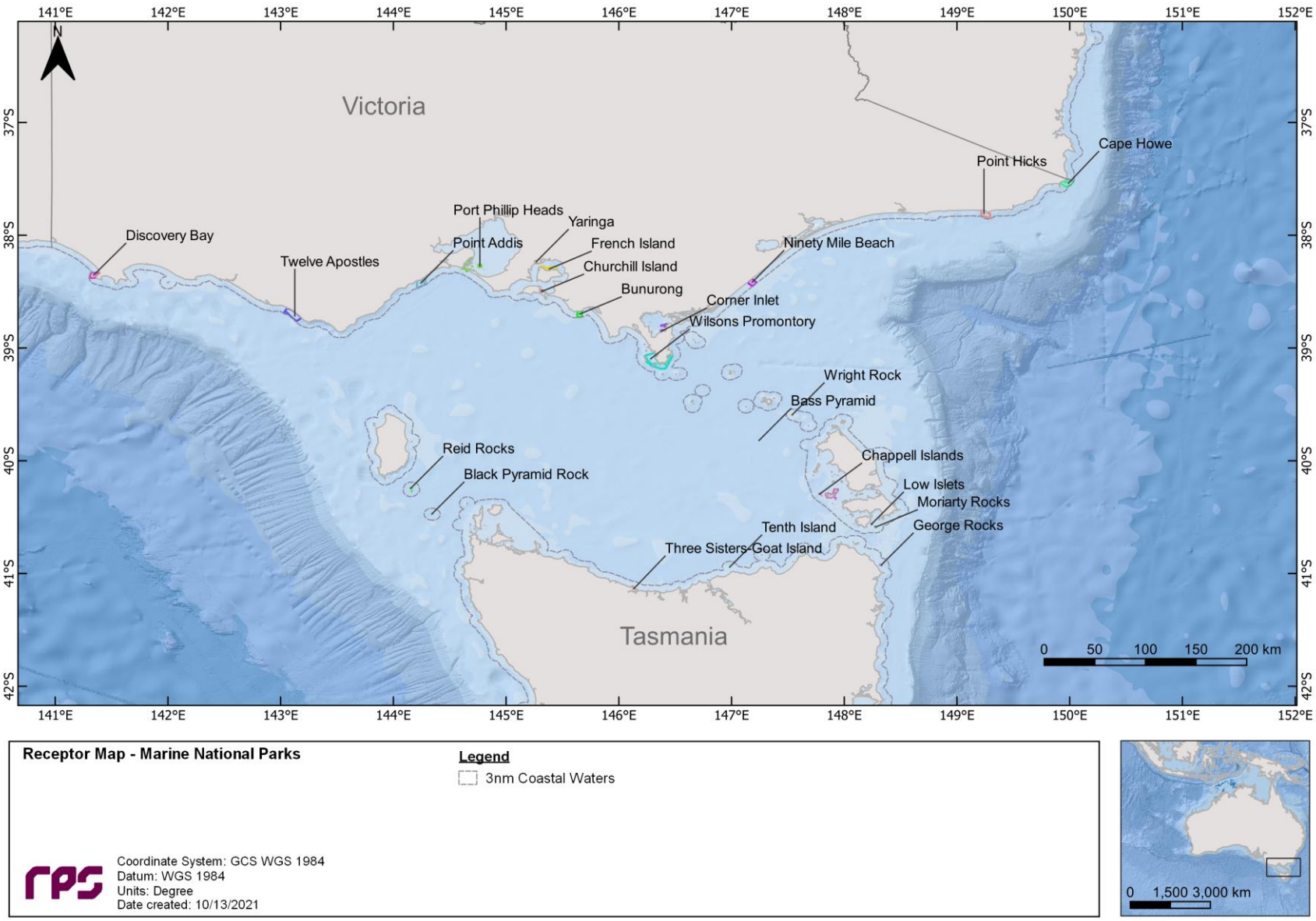

Figure 10-3 Receptor map for Marine National Parks (MNP).

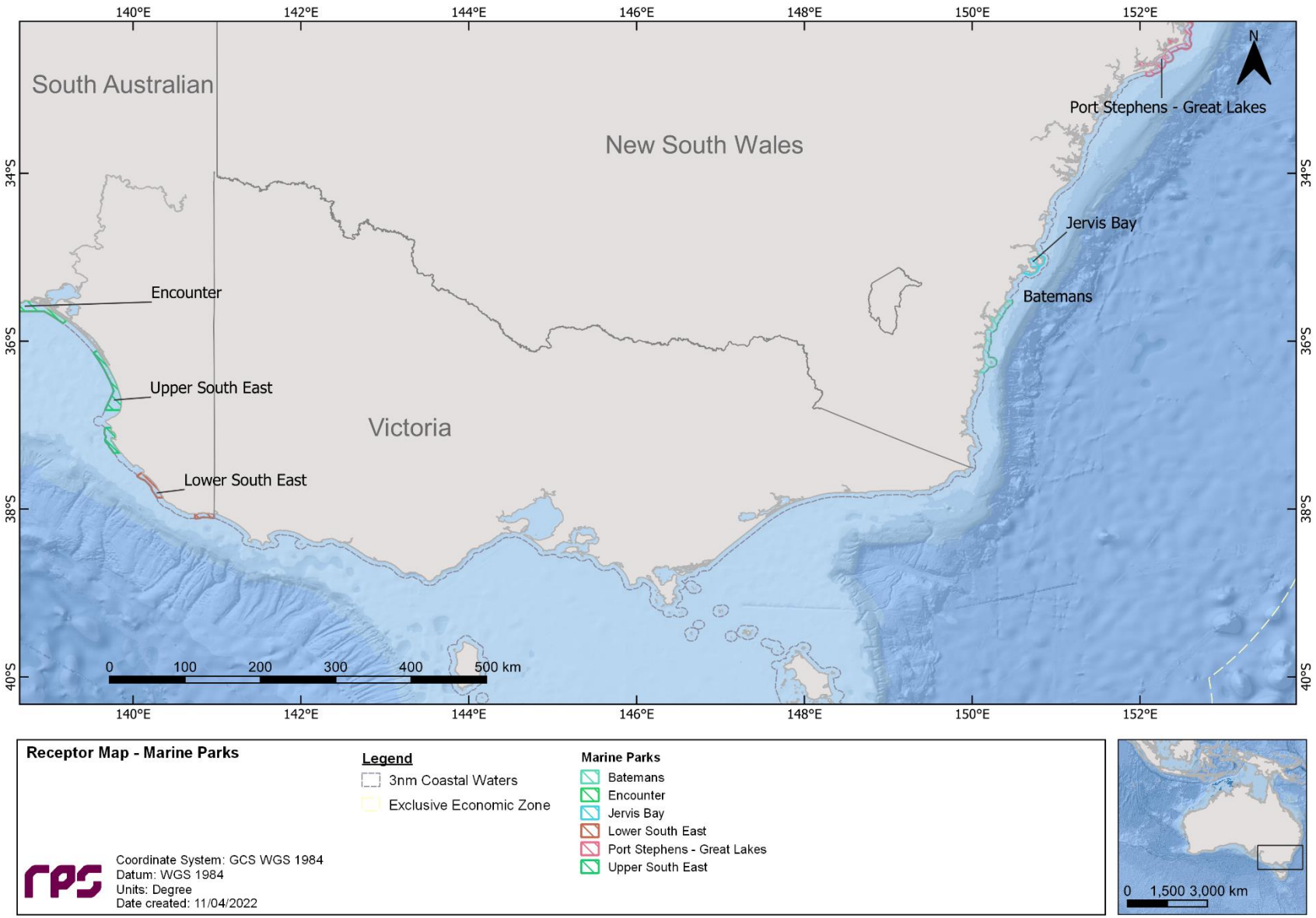

Figure 10-4 Receptor map for Marine Parks (MP).

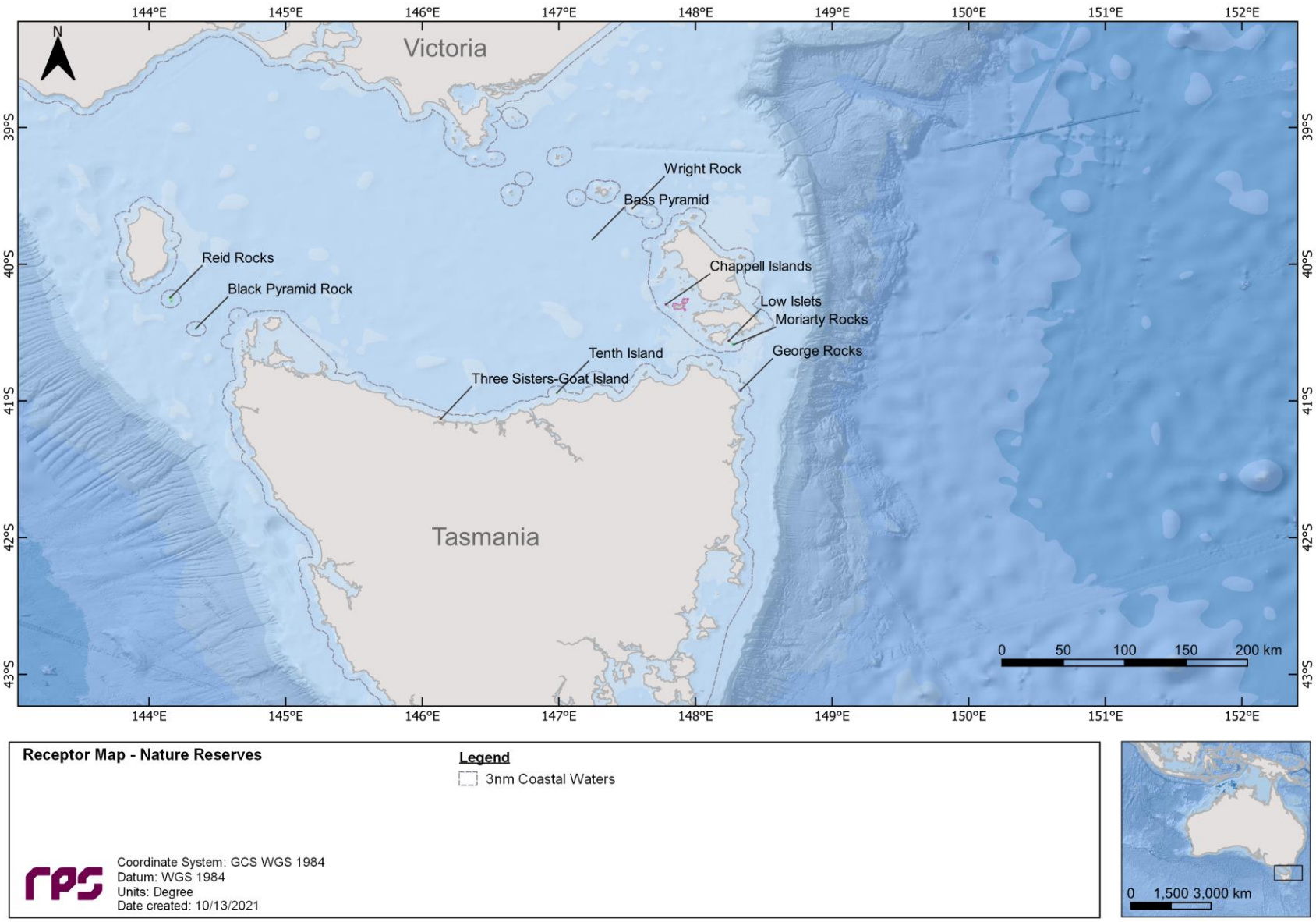

Figure 10-5 Receptor map for Nature Reserves (NR).

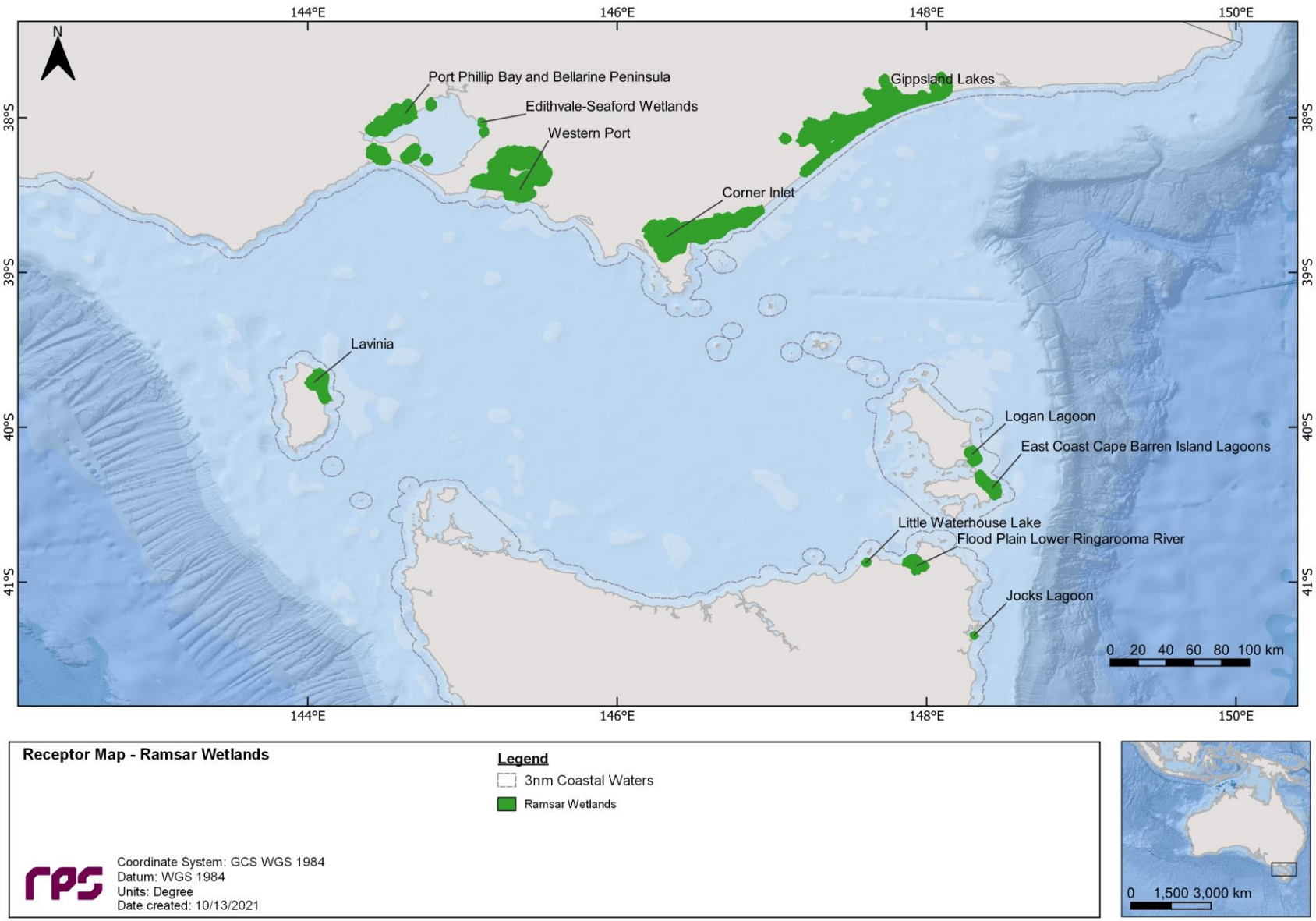

Figure 10-6 Receptor map for Ramsar Sites (Ramsar).

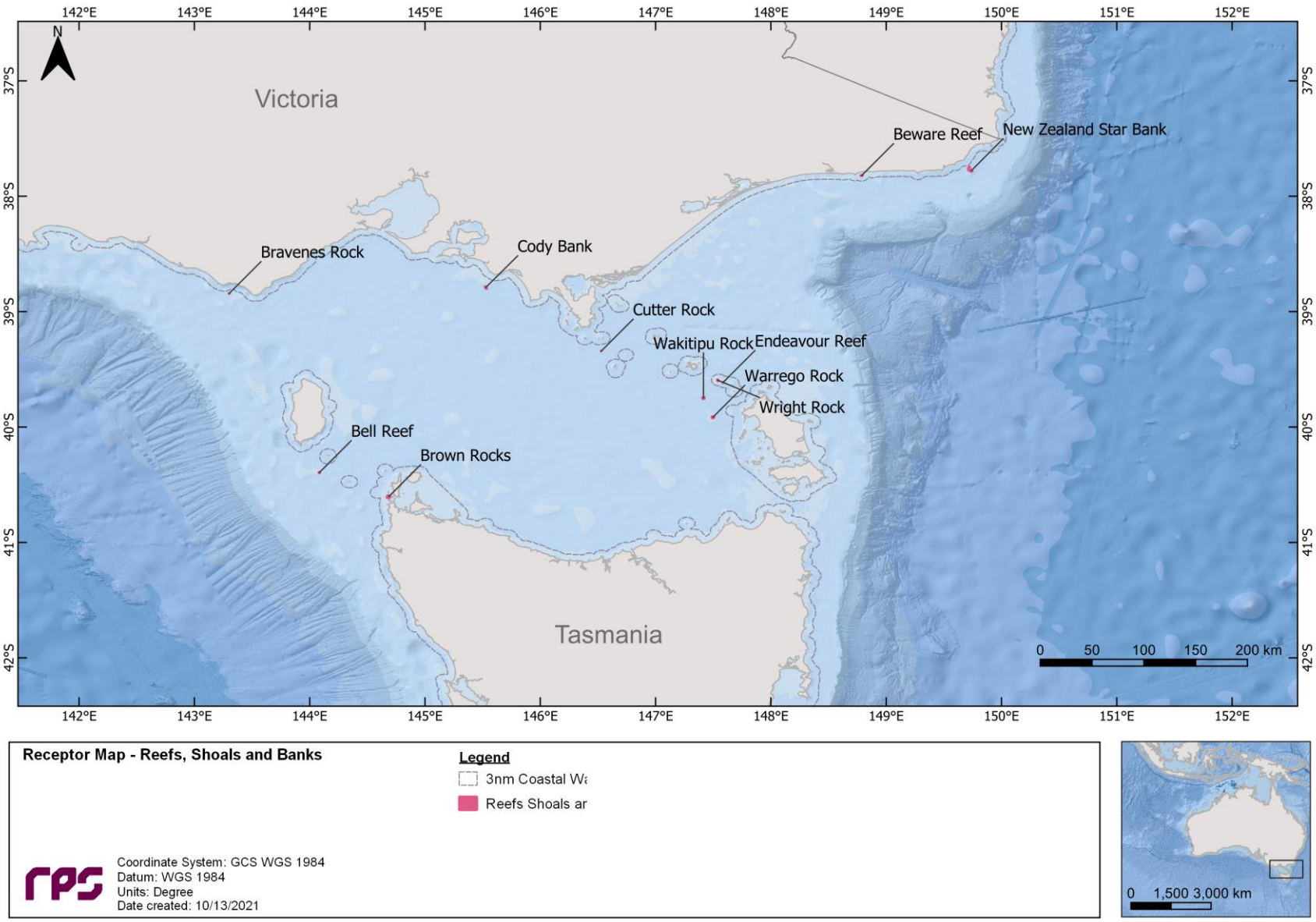

Figure 10-7 Receptor map for Reefs, Shoals and Banks (RSB).

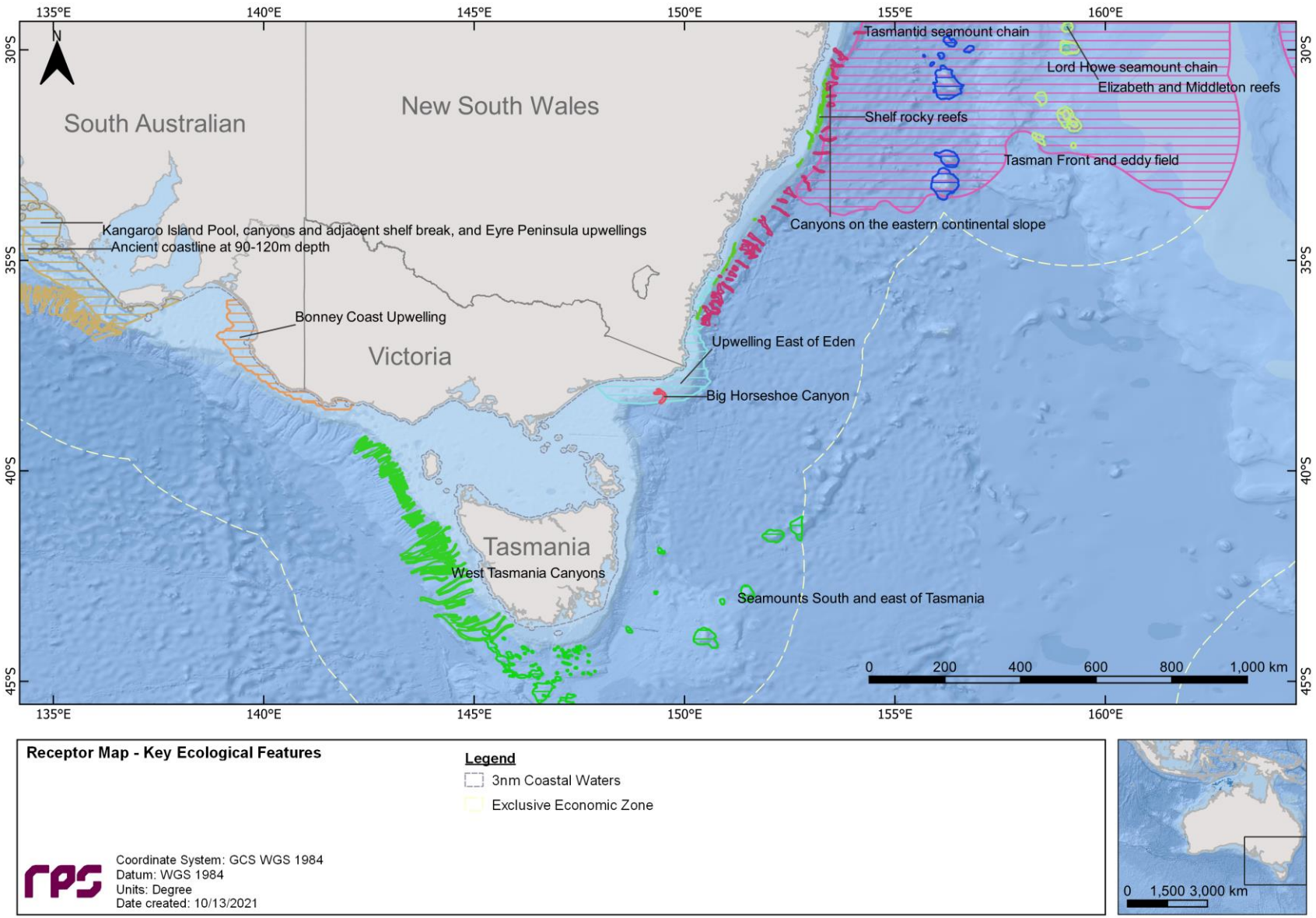

Figure 10-8 Receptor map for Key Ecological Features (KEF).

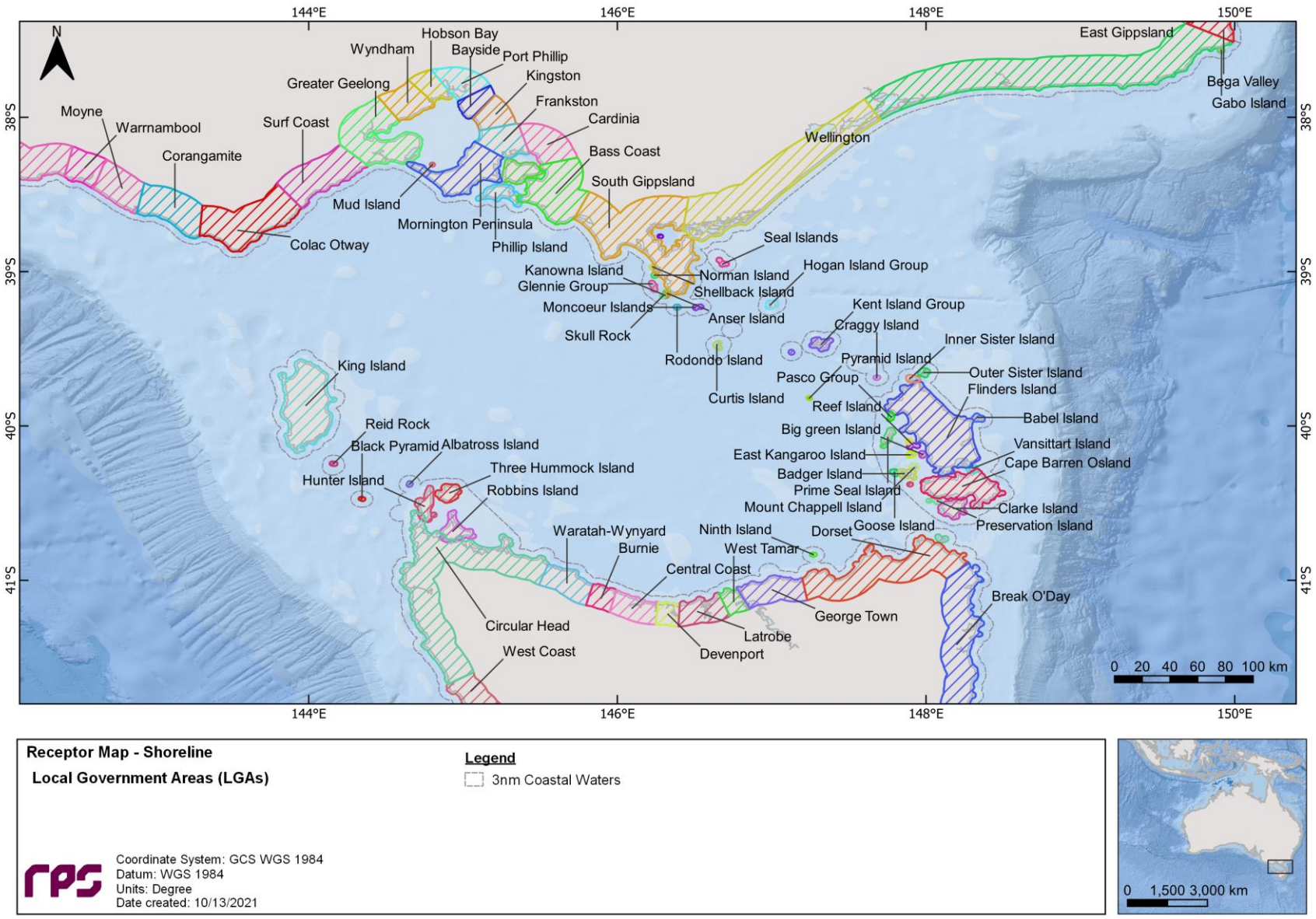

Figure 10-9 Receptor map for shorelines (1 of 3).

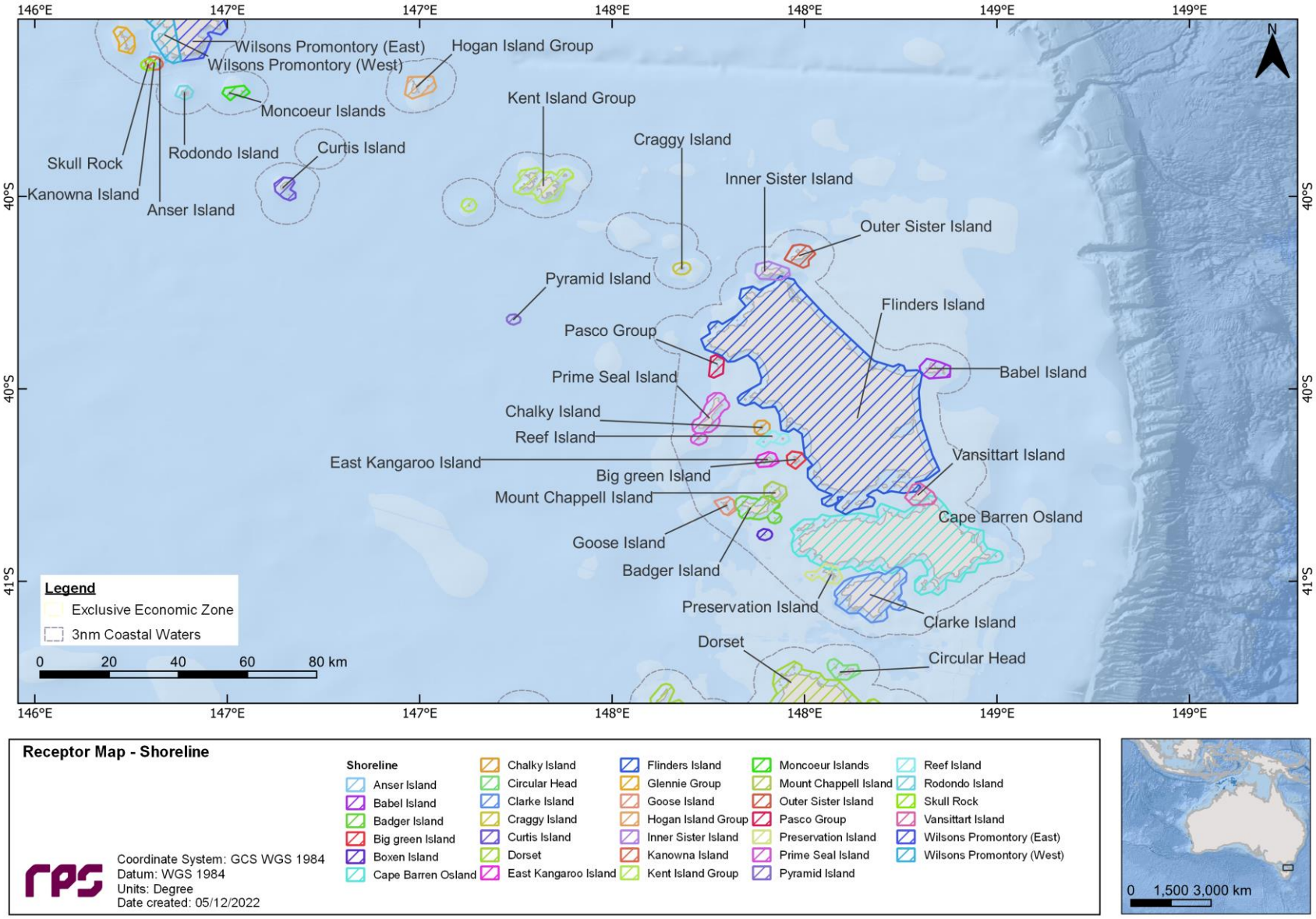

Figure 10-10 Receptor map for shorelines (2 of 3).

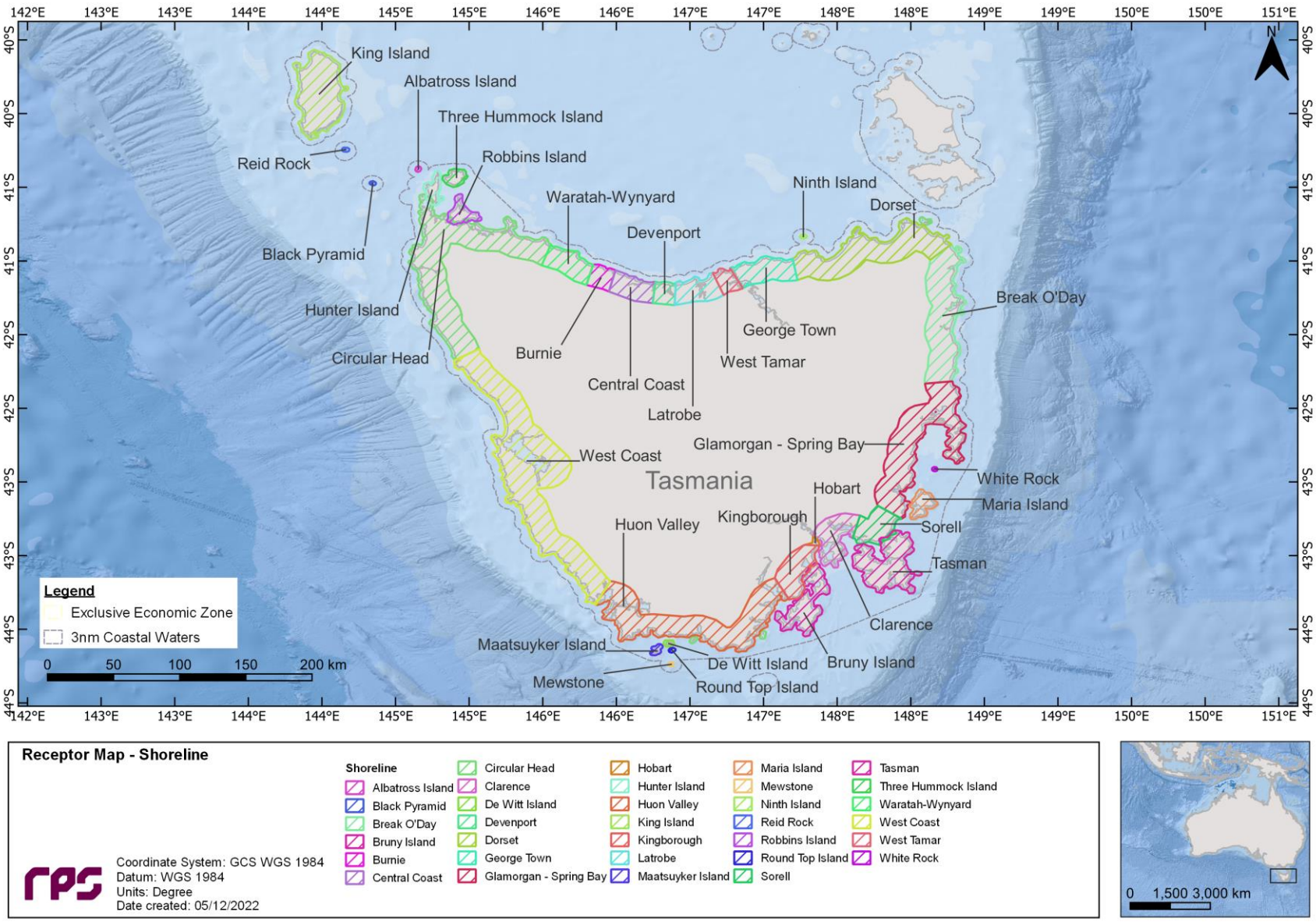

Figure 10-11 Receptor map for shorelines (3 of 3).

11 RESULTS – LOSS OF WELL CONTROL AT RELEASE LOCATION SOUTH

This scenario examined a 97,171.8 m^3 subsea release of condensate over 86 days from a loss of well control at the Release Location South. A total of 200 spill simulations were run (i.e., 100 spills per season) and tracked for 100 days. The results for all 100 simulations per season were combined and are presented on a seasonal basis (i.e., summer and winter).

11.1 Stochastic Analysis

11.1.1 Area of Exposure

Figure 11-1 presents the combined area of potential exposure for surface, shoreline, entrained and dissolved, by overlaying the results from all 200 simulations (i.e., 100 per season) during summer and winter conditions.

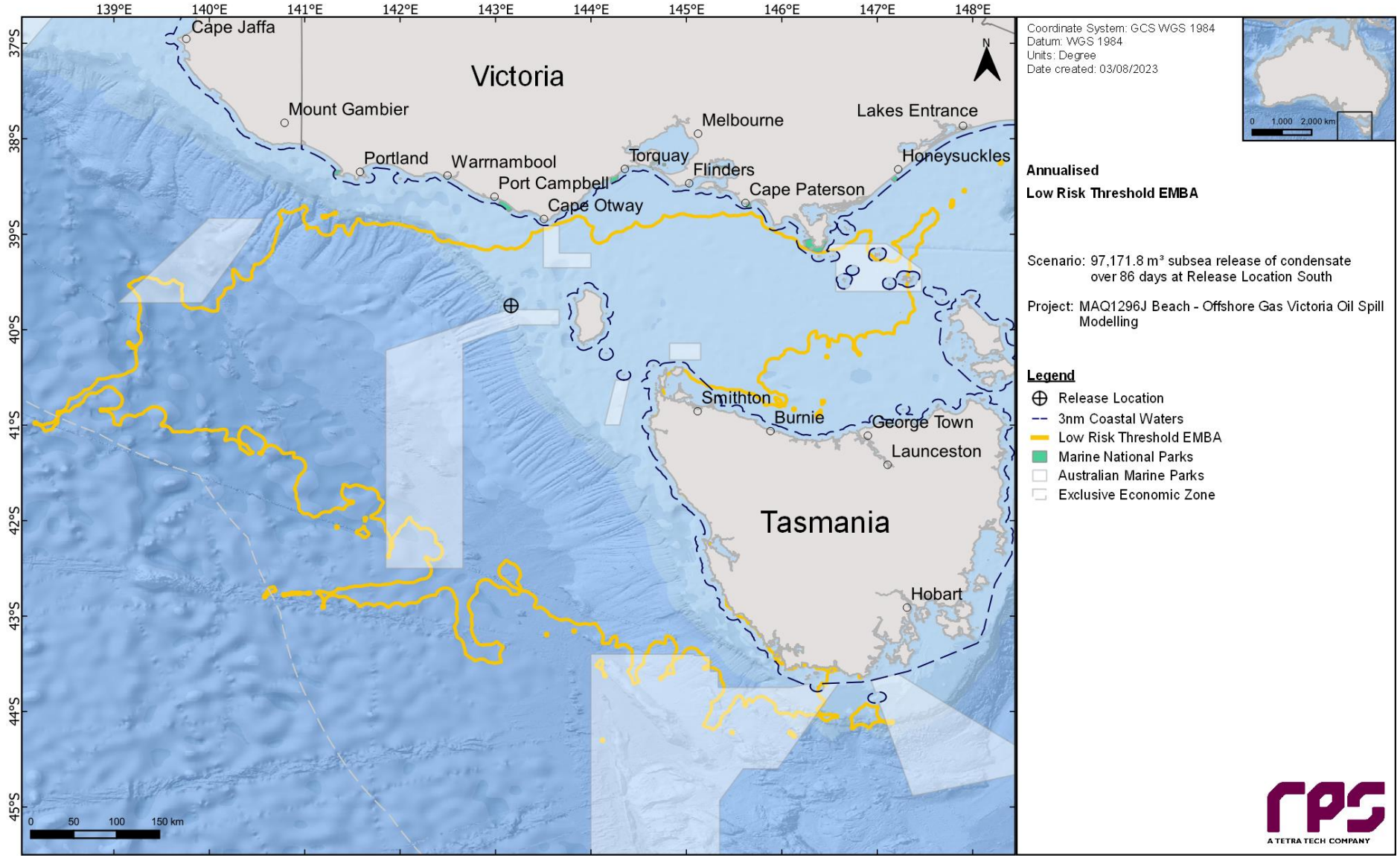

Figure 11-1 Predicted area of exposure for low thresholds produced by overlaying the results from all 200 simulations, resulting from a 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South during summer and winter conditions.

11.1.2 Floating Oil Exposure

Table 11-1 summarises the maximum distance travelled by floating oil on the sea surface at each threshold. The maximum distance from the release location to the low (1–10 g/m^2), moderate (10–50 g/m^2) and high (>50 g/m^2) exposure zones was 79 km (east-southeast) during winter conditions, 20 km (southeast) during summer conditions and 1 km (west-southwest) during summer and winter conditions, respectively.

Table 11-2 summarises the potential floating oil exposure to individual receptors during the summer and winter conditions. Outside of the receptors that the Release Location South resides within (refer to Table 10-2), the Pygmy Blue Whale - Known Foraging Area (100% summer and winter), Little Penguin – Foraging (10 % in winter), Southern Right Whale - Connecting habitat (5% in summer and 50% in winter), White Shark – Foraging (2% in winter) and the White-faced Storm-petrel – Foraging (5% in summer and 50% in winter) were the only BIAs predicted to have floating oil exposure above the low threshold.

Table 11-3 presents the maximum residence time of floating oil exposure for each individual grid cell within each individual receptor during summer and winter.

Figure 11-2 and Figure 11-3 present the zones of potential floating oil exposure for all thresholds under summer and winter conditions, respectively.

Figure 11-4 to Figure 11-7 present the maximum residence time of floating oil exposure for the NOPSEMA thresholds during summer and winter, respectively.

Table 11-1 Maximum distance and direction from the release location to the edge of floating oil exposure. Results are based on a 69,120.0 m^3 subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations per season.

Season	Distance and direction travelled	Zones of potential floating oil exposure		
		Low	Moderate	High
Summer	Maximum distance (km) from release location	70	20	1
	Maximum distance (km) from release location (99th percentile)	57	19	1
	Direction	ESE	SE	WSW
Winter	Maximum distance (km) from release location	79	19	1
	Maximum distance (km) from release location (99th percentile)	60	17	1
	Direction	ESE	NW	WSW

Table 11-2 Summary of the potential floating oil exposure to individual receptors. Results are based on a 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March)						Winter (April to October)					
		Probability of floating oil exposure (%)			Minimum time before floating oil exposure (days)			Probability of floating oil exposure (%)			Minimum time before floating oil exposure (days)		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
AMP	Zeehan	100	96	-	< 1	1	-	100	88	-	< 1	< 1	-
BIA	Antipodean Albatross – Foraging*	100	100	38	< 1	< 1	1	100	100	60	< 1	< 1	< 1
	Black-browed Albatross – Foraging*	100	100	38	< 1	< 1	1	100	100	60	< 1	< 1	< 1
	Black-faced Cormorant – Foraging*	-	-	-	-	-	-	12	-	-	17	-	-
	Bullers Albatross – Foraging*	100	100	38	< 1	< 1	1	100	100	60	< 1	< 1	< 1
	Campbell Albatross – Foraging*	100	100	38	< 1	< 1	1	100	100	60	< 1	< 1	< 1
	Common Diving-petrel – Foraging*	100	100	38	< 1	< 1	1	100	100	60	< 1	< 1	< 1
	Indian Yellow-nosed Albatross – Foraging*	100	100	38	< 1	< 1	1	100	100	60	< 1	< 1	< 1
	Little Penguin – Foraging	-	-	-	-	-	-	10	-	-	18	-	-
	Pygmy Blue Whale – Distribution*	100	100	38	< 1	< 1	1	100	100	60	< 1	< 1	< 1
	Pygmy Blue Whale – Foraging*	100	100	38	< 1	< 1	1	100	100	60	< 1	< 1	< 1
	Pygmy Blue Whale – Foraging (annual high use area)*	100	100	38	< 1	< 1	1	100	100	60	< 1	< 1	< 1
	Pygmy Blue Whale - Known Foraging Area	100	100	-	< 1	< 1	-	100	100	-	< 1	< 1	-
	Short-tailed Shearwater – Foraging*	100	100	38	< 1	< 1	1	100	100	60	< 1	< 1	< 1
	Shy Albatross – Foraging*	100	100	38	< 1	< 1	1	100	100	60	< 1	< 1	< 1
	Southern Right Whale - Connecting habitat	5	-	-	66	-	-	50	-	-	10	-	-
	Southern Right Whale - Known Core Range*	100	100	38	< 1	< 1	1	100	100	60	< 1	< 1	< 1
	Wandering Albatross – Foraging*	100	100	38	< 1	< 1	1	100	100	60	< 1	< 1	< 1
	Wedge-tailed Shearwater – Foraging*	100	100	38	< 1	< 1	1	100	100	60	< 1	< 1	< 1
	White Shark – Distribution	100	100	38	< 1	< 1	1	100	100	60	< 1	< 1	< 1
	White Shark – Foraging	-	-	-	-	-	-	2	-	-	35	-	-
	White-faced Storm-petrel – Foraging	5	-	-	66	-	-	50	-	-	10	-	-
EEZ	Australian *	100	100	38	< 1	< 1	1	100	100	60	< 1	< 1	< 1
IBRA	King Island	5	-	-	66	-	-	50	-	-	10	-	-
IMCRA	Otway*	100	100	38	< 1	< 1	1	100	100	60	< 1	< 1	< 1
KEF	West Tasmania Canyons	100	48	-	< 1	3	-	99	12	-	< 1	2	-
SHORE	King Island	5	-	-	66	-	-	50	-	-	10	-	-
State Waters	Tasmania	5	-	-	66	-	-	50	-	-	10	-	-

*The release location resides within the receptor boundaries.

Table 11-3 Summary of the maximum residence time of floating oil exposure for each individual grid cell within each individual receptor. Results are based on a 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March) Maximum residence time of floating oil exposure (days)			Winter (April to October) Maximum residence time of floating oil exposure (days)		
		Low	Moderate	High	Low	Moderate	High
AMP	Zeehan	1	< 1	-	1	< 1	-
BIA	Antipodean Albatross - Foraging**	80	64	< 1	86	46	< 1
	Black-browed Albatross - Foraging**	80	64	< 1	86	46	< 1
	Black-faced Cormorant - Foraging	-	-	-	< 1	-	-
	Bullers Albatross - Foraging**	80	64	< 1	86	46	< 1
	Campbell Albatross – Foraging*	80	64	< 1	86	46	< 1
	Common Diving-petrel – Foraging*	80	64	< 1	86	46	< 1
	Indian Yellow-nosed Albatross – Foraging*	80	64	< 1	86	46	< 1
	Little Penguin - Foraging	-	-	-	< 1	-	-
	Pygmy Blue Whale – Distribution*	80	64	< 1	86	46	< 1
	Pygmy Blue Whale – Foraging*	80	64	< 1	86	46	< 1
	Pygmy Blue Whale - Foraging (annual high use area)**	80	64	< 1	86	46	< 1
	Pygmy Blue Whale - Known Foraging Area	2	< 1	-	1	< 1	-
	Short-tailed Shearwater – Foraging*	80	64	< 1	86	46	< 1
	Shy Albatross – Foraging*	80	64	< 1	86	46	< 1
	Southern Right Whale - Connecting habitat	< 1	-	-	1	-	-
	Southern Right Whale - Known Core Range*	80	64	< 1	86	46	< 1
	Wandering Albatross – Foraging*	80	64	< 1	86	46	< 1
	Wedge-tailed Shearwater – Foraging*	80	64	< 1	86	46	< 1
	White Shark – Distribution*	80	64	< 1	86	46	< 1
	White Shark - Foraging	-	-	-	< 1	-	-
	White-faced Storm-petrel - Foraging	< 1	-	-	1	-	-
EEZ	Australian*	80	64	< 1	86	46	< 1
IBRA	King Island	< 1	-	-	1	-	-
IMCRA	Otway*	80	64	< 1	86	46	< 1
KEF	West Tasmania Canyons	1	< 1	-	1	< 1	-
SHORE	King Island	< 1	-	-	1	-	-
State Waters	Tasmania	< 1	-	-	1	-	-

*The release location resides within the receptor boundaries.

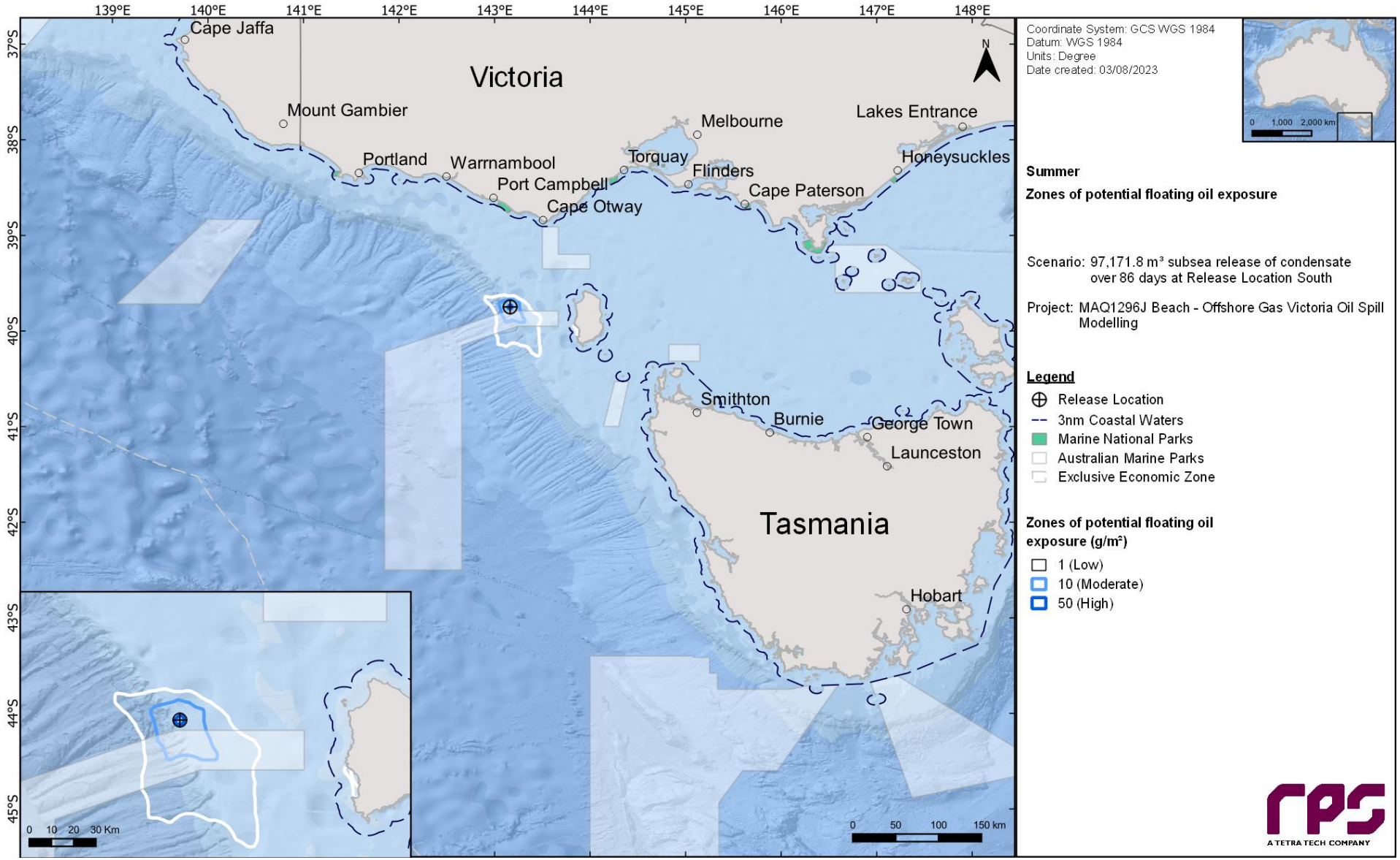

Figure 11-2 Zones of potential floating oil exposure in the event of a 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations during summer conditions.

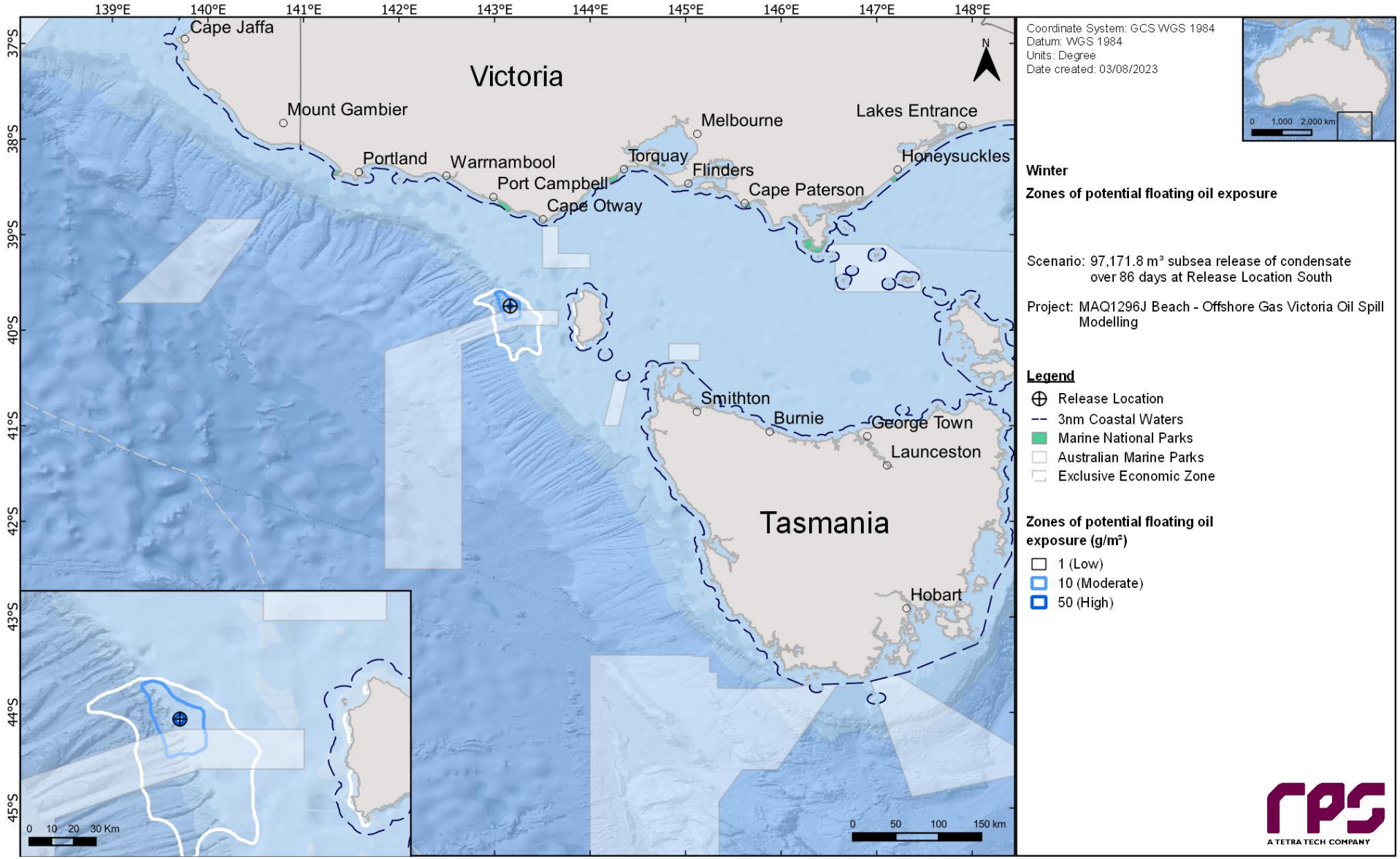

Figure 11-3 Zones of potential floating oil exposure in the event of a 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations during winter conditions.

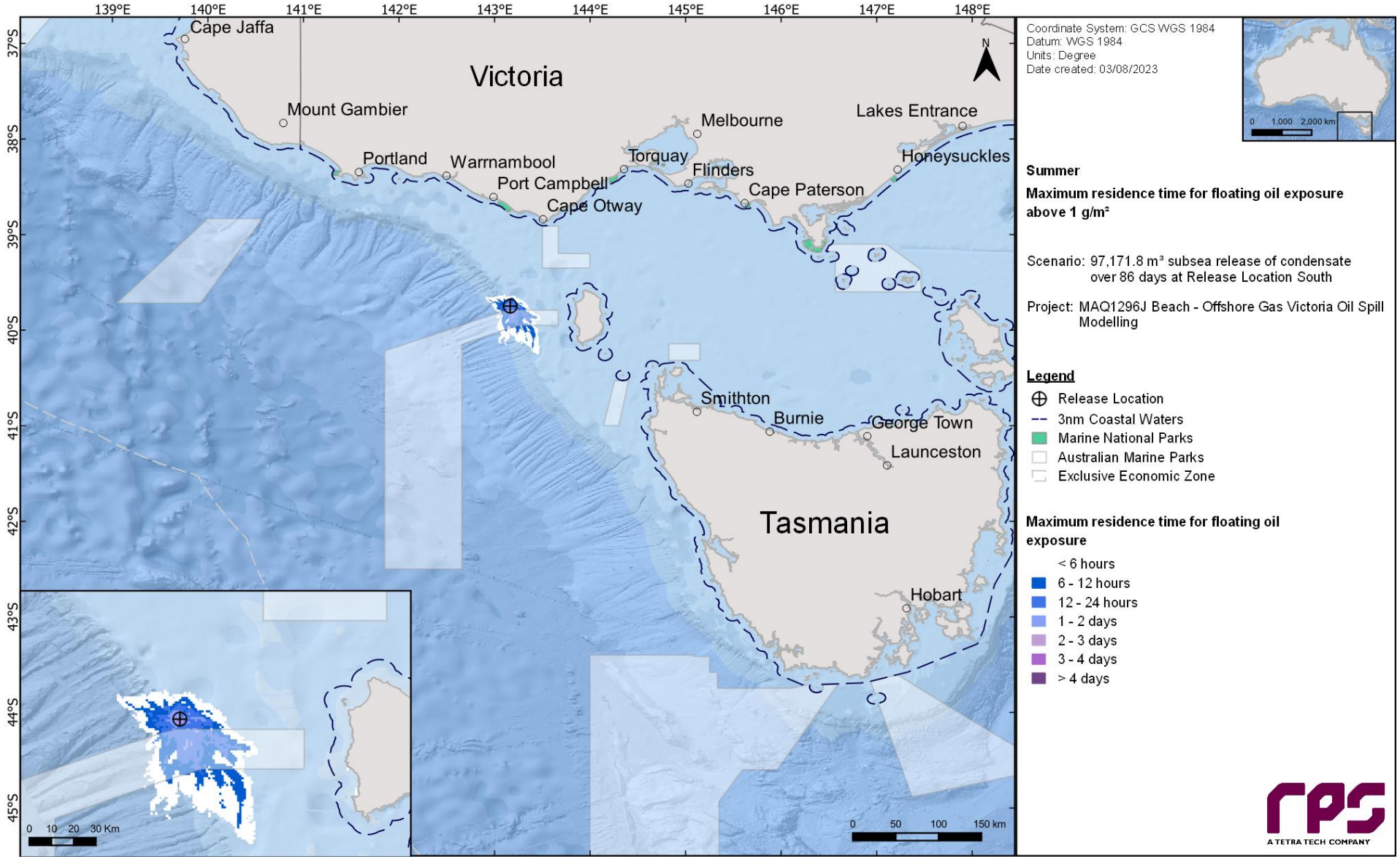

Figure 11-4 Maximum residence time of floating oil exposure above 1 g/m², in the event of 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations during summer conditions.

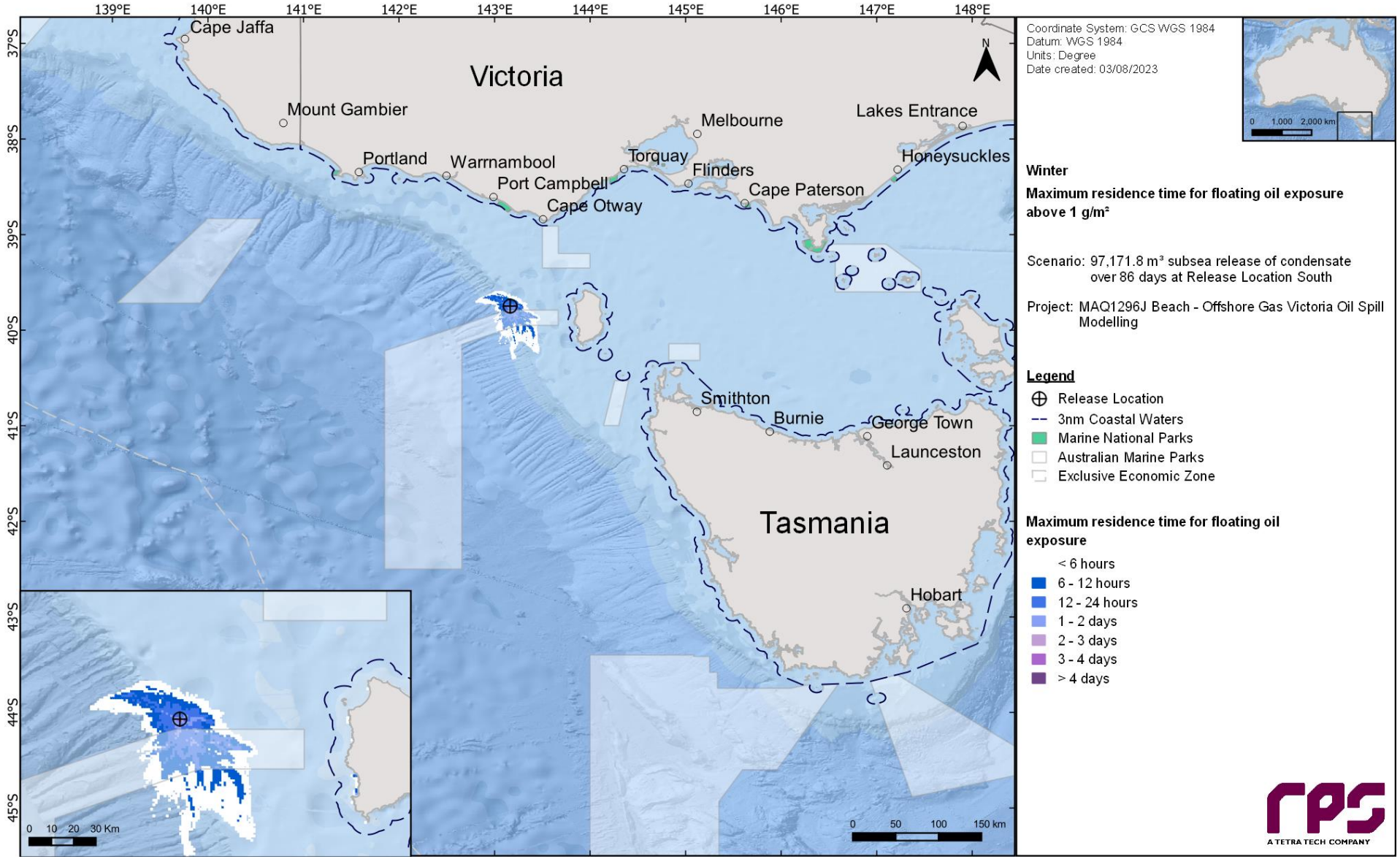

Figure 11-5 Maximum residence time of floating oil exposure above 1 g/m², in the event of 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations during winter conditions.

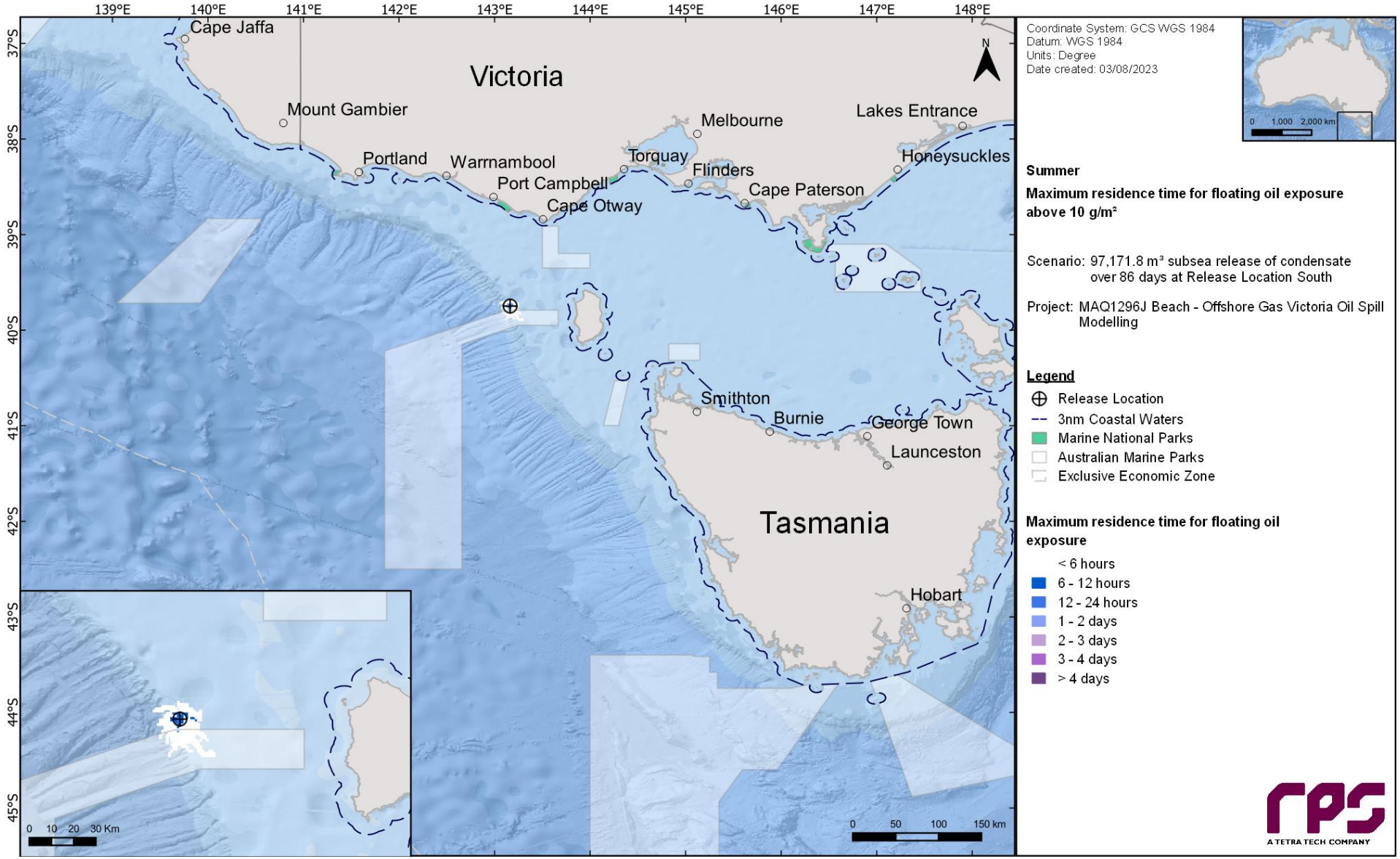

Figure 11-6 Maximum residence time of floating oil exposure above 10 g/m², in the event of 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations during summer conditions.

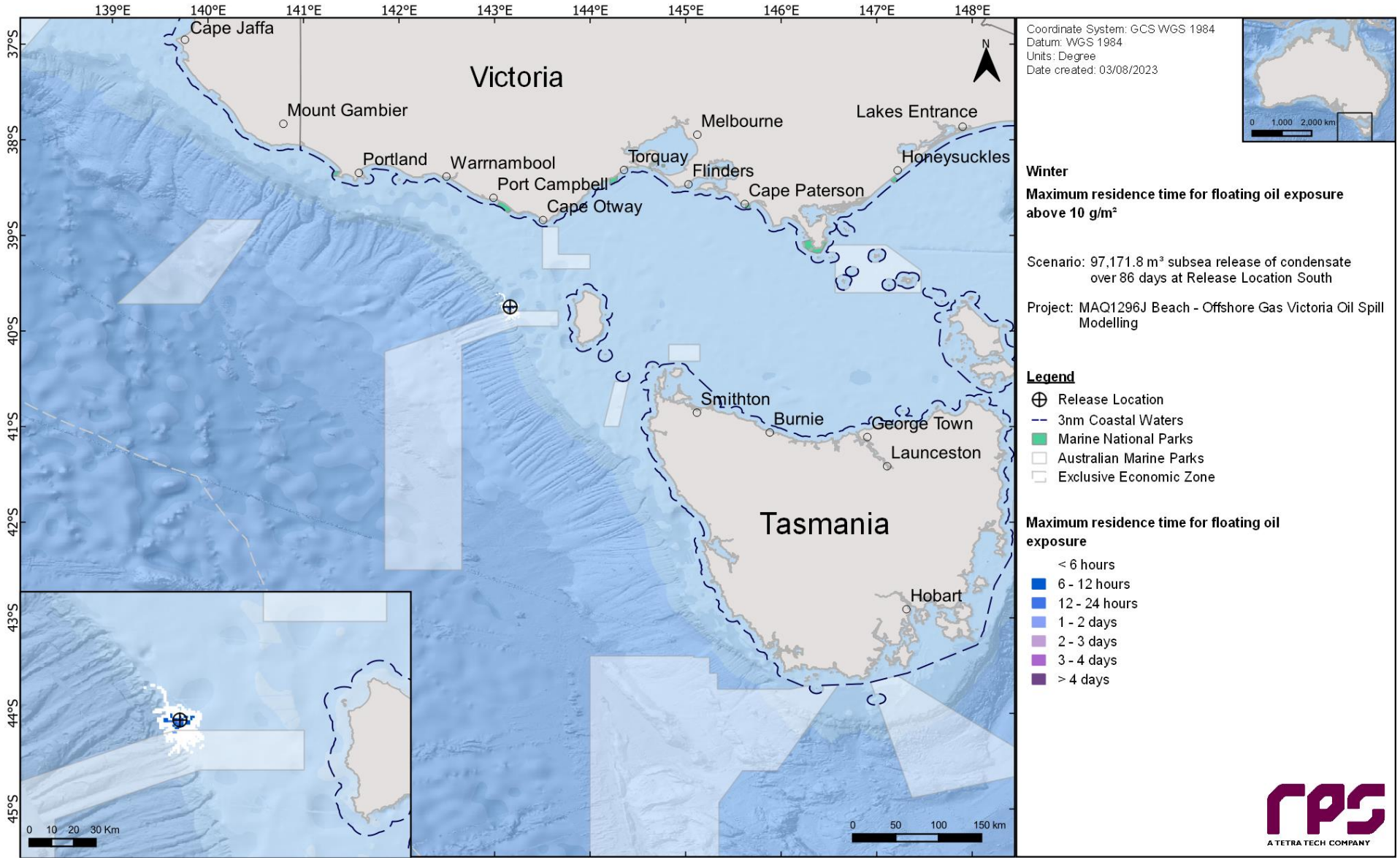

Figure 11-7 Maximum residence time of floating oil exposure above 10 g/m², in the event of 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations during winter conditions.

11.1.3 Shoreline Accumulation

Table 11-4 presents a summary of the predicted potential shoreline accumulation during the summer and winter conditions. The probability of accumulation to any shoreline at, or above, the low level (10 g/m^2) threshold was 89% during summer conditions and 100% during winter conditions. The minimum time before oil accumulation at, or above, the low threshold was 10 days during summer conditions, and 5 days during winter conditions. The maximum volume ashore for a single spill trajectory during the summer and winter conditions was 99 m^3 and 193 m^3, respectively, whilst the maximum length of shoreline accumulation at the low threshold was 115 km and 138 km, respectively. For the moderate threshold, the maximum length of shoreline accumulation was 16 km during summer and 44 km during winter. No accumulation at the high threshold was predicted during summer, but in winter the maximum length of shoreline accumulation was predicted to be 3 km.

Table 11-5 summarises the shoreline accumulation on individual receptors during the summer and winter conditions. King Island recorded the highest probability of shoreline accumulation at the low threshold with 82% (summer) and 100% (winter).

The minimum time before shoreline accumulation above the low threshold was 10 days (summer) and 5 days (winter) predicted for King Island.

The summer and winter conditions maximum potential shoreline loading above the low, moderate and high shoreline thresholds are presented in Figure 11-8 and Figure 11-9, respectively.

Table 11-4 Summary of oil accumulation across all shorelines. Results are based on a 69,120.0 m^3 subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations per season.

Shoreline Statistics	Summer	Winter
Probability of accumulation on any shoreline (%)	89	100
Absolute minimum time for visible oil to shore (days)	10	5
Maximum total volume of hydrocarbons ashore (m^3)	99	193
Average volume of hydrocarbons ashore (m^3)	25	88
Maximum length of the shoreline at **10 g/m^2** (km)	115	138
Average shoreline length (km) at **10 g/m^2** (km)	39	73
Maximum length of the shoreline at **100 g/m^2** (km)	16	44
Average shoreline length (km) at **100 g/m^2** (km)	3	16
Maximum length of the shoreline at **1,000 g/m^2** (km)	-	3
Average shoreline length (km) at **1,000 g/m^2** (km)	-	1

Table 11-5 Summary of oil accumulation on individual shoreline receptors. Results are based on a 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations per season.

Shoreline Receptor		Summer																			Winter													
		Maximum probability of shoreline loading (%)			Minimum time before shoreline accumulation (days)			Load on shoreline (g/m²)		Volume on shoreline (m³)		Mean length of shoreline accumulation (km)			Maximum length of shoreline accumulation (km)			Maximum probability of shoreline loading (%)			Minimum time before shoreline accumulation (days)			Load on shoreline (g/m²)		Volume on shoreline (m³)		Mean length of shoreline accumulation (km)			Maximum length of shoreline accumulation (km)		
		Low	Mod	High	Low	Mod	High	Mean	Peak	Mean	Peak	Low	Mod	High	Low	Mod	High	Low	Mod	High	Low	Mod	High	Mean	Peak	Mean	Peak	Low	Mod	High	Low	Mod	High
SHORE	Black Pyramid	6	-	-	38	-	-	4	21	< 1	1	1	-	-	2	-	-	16	-	-	17	-	-	5	40	< 1	1	1	-	-	2	-	-
	Circular Head	41	-	-	33	-	-	2	56	3	9	6	-	-	15	-	-	42	-	-	30	-	-	2	66	3	10	5	-	-	18	-	-
	Hunter Island	33	-	-	33	-	-	2	48	1	3	3	-	-	6	-	-	29	-	-	20	-	-	2	79	1	4	4	-	-	7	-	-
	Huon Valley	18	-	-	56	-	-	< 1	18	1	3	1	-	-	3	-	-	15	-	-	39	-	-	< 1	68	1	4	2	-	-	6	-	-
	Kent Island Group	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	60	-	-	< 1	16	< 1	1	1	-	-	1	-	-
	King Island	82	37	-	10	11	-	7	704	12	86	21	3	-	72	15	-	100	91	37	5	9	19	37	3,419	77	188	54	14	1	87	40	3
	Maatsuyker Island	48	1	-	35	96	-	3	159	1	3	2	1	-	5	1	-	31	15	-	27	46	-	5	223	1	5	3	1	-	6	2	-
	Reid Rock	37	-	-	21	-	-	6	26	< 1	1	1	-	-	3	-	-	39	-	-	15	-	-	7	27	< 1	1	2	-	-	3	-	-
	West Coast	66	9	-	32	48	-	2	143	8	22	14	1	-	40	2	-	37	2	-	28	57	-	2	111	5	22	18	1	-	40	2	-

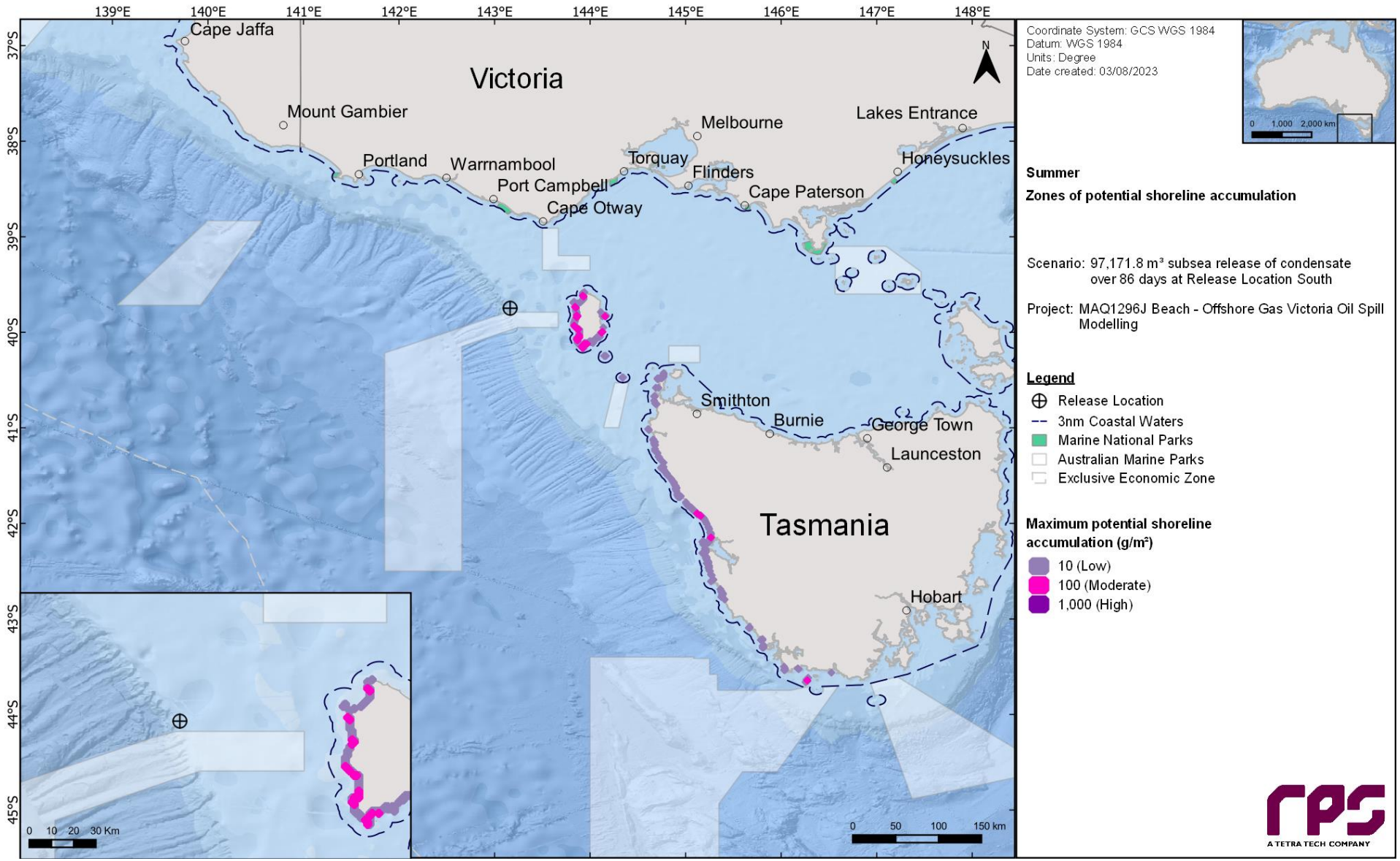

Figure 11-8 **Maximum potential shoreline loading in the event of a 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations during summer conditions.**

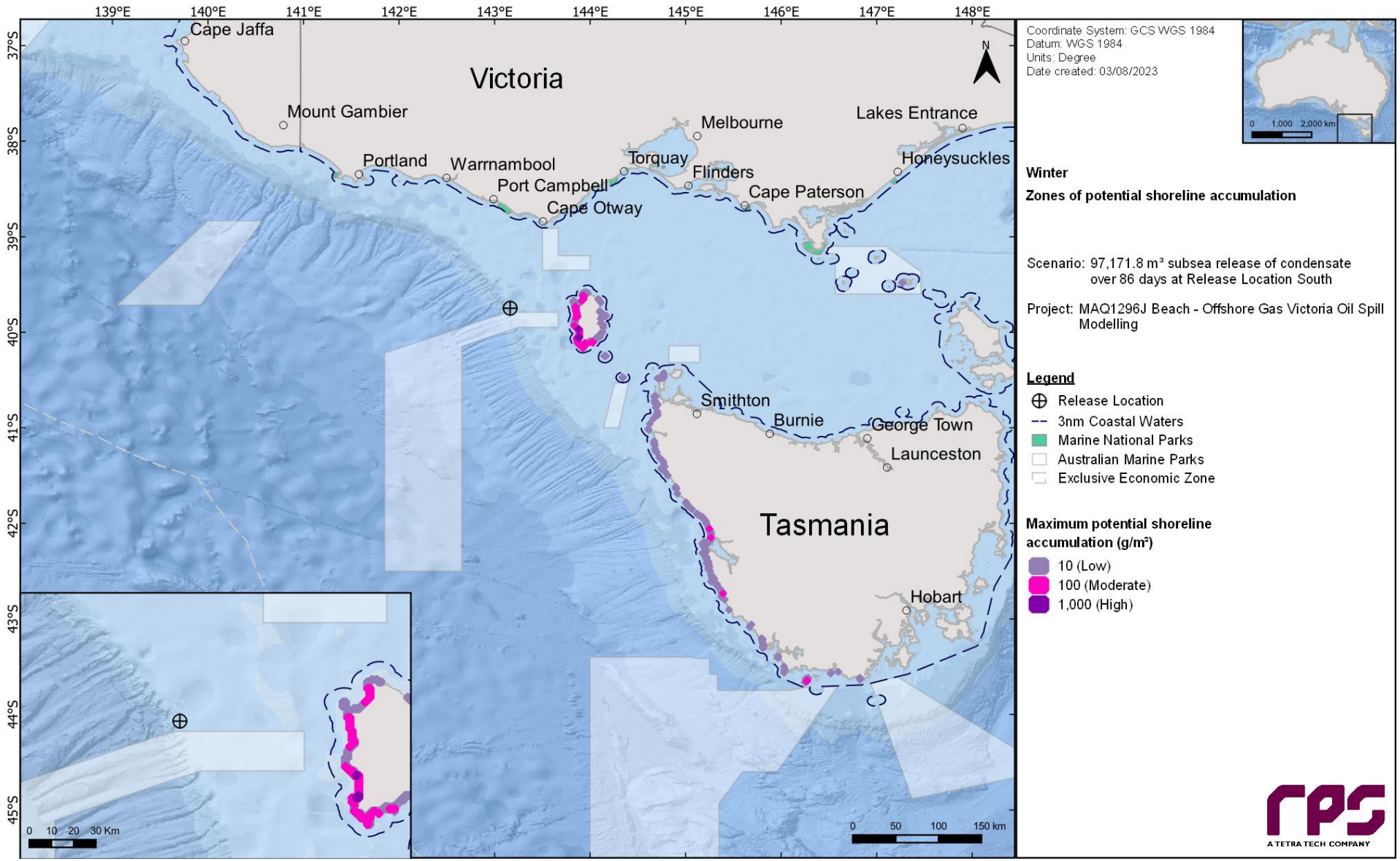

Figure 11-9 Maximum potential shoreline loading in the event of a 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations during winter conditions.

11.1.4 In-water exposure

11.1.4.1 Dissolved Hydrocarbons

Table 11-6 summarises the probability of exposure to individual receptors from dissolved hydrocarbons in the 0-10 m layer during the summer and winter conditions.

Outside of the receptors that the Release Location South resides within (refer to Table 10-2), the highest concentration of dissolved hydrocarbon was predicted for the Pygmy Blue Whale - Known Foraging Area (summer – 1,904 ppb, winter – 1,665 ppb) and White-faced Storm-petrel – Foraging (summer – 1,904 ppb, winter – 1,135 ppb) receptors, which also held the highest probabilities of low dissolved hydrocarbon exposure (100% during summer and winter).

Table 11-7 presents the predicted minimum time to dissolved hydrocarbon exposure and maximum residence time for dissolved hydrocarbon exposure to individual receptors, in the 0-10 m depth layer, for all seasonal conditions and all thresholds assessed. Outside of the receptors that the Release Location South resides within, the maximum residence time of dissolved hydrocarbon exposure at the low threshold was predicted for Pygmy Blue Whale – Known Foraging Area BIA (summer – 7 days, winter – 6 days).

Figure 11-10 and Figure 11-11 present the zones of potential dissolved hydrocarbon exposure for the 0-10 m depth layer, for each threshold assessed under summer and winter conditions, respectively.

Figure 11-12 to Figure 11.17 presents the maximum residence time of dissolved hydrocarbon exposure for the NOPSEMA thresholds in summer and winter.

Table 11-6 Probability of dissolved hydrocarbons exposure to marine based receptors in the 0–10 m dept. Results are based on a 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March)				Winter (April to October)			
		Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure			Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure		
			Low	Moderate	High		Low	Moderate	High
AMP	Apollo	97	6	1	-	96	7	1	-
	Beagle	57	1	1	-	25	1	-	-
	Boags	84	11	1	-	146	12	3	-
	Franklin	211	68	11	-	312	62	10	-
	Nelson	4	-	-	-	26	2	-	-
	Tasman Fracture	15	1	-	-	23	2	-	-
	Zeehan	1,752	100	100	42	1,665	100	100	41
BIA	Antipodean Albatross - Foraging*	1,904	100	100	88	1,839	100	100	100
	Australasian Gannet - Foraging	542	81	25	1	352	92	35	-
	Black-browed Albatross - Foraging*	1,904	100	100	88	1,839	100	100	100
	Black-faced Cormorant - Foraging	277	24	5	-	609	73	35	1
	Bullers Albatross - Foraging*	1,904	100	100	88	1,839	100	100	100
	Campbell Albatross – Foraging*	1,904	100	100	88	1,839	100	100	100
	Common Diving-petrel – Foraging*	1,904	100	100	88	1,839	100	100	100
	Indian Yellow-nosed Albatross – Foraging*	1,904	100	100	88	1,839	100	100	100
	Little Penguin - Foraging	242	46	7	-	418	71	32	1
	Pygmy Blue Whale – Distribution*	1,904	100	100	88	1,839	100	100	100
	Pygmy Blue Whale – Foraging*	1,904	100	100	88	1,839	100	100	100
	Pygmy Blue Whale - Foraging (annual high use area)*	1,790	100	100	88	1,839	100	100	100
	Pygmy Blue Whale - Known Foraging Area	1,904	100	100	48	1,665	100	100	45
	Short-tailed Shearwater - Breeding	8	-	-	-	10	1	-	-
	Short-tailed Shearwater – Foraging*	1,904	100	100	88	1,839	100	100	100
	Shy Albatross - Breeding	30	5	-	-	19	3	-	-
	Shy Albatross – Foraging*	1,904	100	100	88	1,839	100	100	100
	Soft-plumaged Petrel - Foraging	201	49	6	-	483	21	5	1

Receptor		Summer (November through to March)				Winter (April to October)			
		Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure			Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure		
			Low	Moderate	High		Low	Moderate	High
	Sooty Shearwater - Foraging	27	3	-	-	42	4	-	-
	Southern Right Whale - Connecting habitat	340	31	7	-	617	90	46	1
	Southern Right Whale - Known Core Range*	1,904	100	100	88	1,839	100	100	100
	Wandering Albatross – Foraging*	1,904	100	100	88	1,839	100	100	100
	Wedge-tailed Shearwater – Foraging*	1,790	100	100	88	1,839	100	100	100
	White Shark – Distribution*	1,904	100	100	88	1,839	100	100	100
	White Shark - Foraging	542	72	19	1	617	94	55	1
	White-faced Storm-petrel - Foraging	1,904	100	96	4	1,135	100	97	4
EEZ	Australian*	1,904	100	100	88	1,839	100	100	100
IBRA	Flinders	13	1	-	-	28	1	-	-
	King Island	284	43	7	-	617	90	37	1
	Tasmanian West	50	5	-	-	42	5	-	-
	Wilsons Promontory	0	-	-	-	19	2	-	-
IMCRA	Boags	85	14	1	-	146	9	1	-
	Central Bass Strait	334	30	5	-	385	55	8	-
	Central Victoria	6	-	-	-	29	2	-	-
	Davey	19	1	-	-	35	2	-	-
	Flinders	63	2	1	-	51	3	1	-
	Franklin	354	92	22	-	483	63	10	1
	Otway*	1,904	100	100	88	1,839	100	100	100
	Twofold Shelf	6	-	-	-	28	1	-	-
KEF	Seamounts South and east of Tasmania	4	-	-	-	21	1	-	-
	West Tasmania Canyons	1,632	100	100	32	1,227	100	100	16
NP	Kent Group	6	-	-	-	28	1	-	-
RSB	Bell Reef	123	54	8	-	222	78	16	-
	Brown Rocks	16	2	-	-	13	1	-	-
SHORE	Albatross Island	63	9	1	-	37	5	-	-

Receptor		Summer (November through to March)				Winter (April to October)			
		Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure			Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure		
			Low	Moderate	High		Low	Moderate	High
	Black Pyramid	104	35	5	-	241	46	5	-
	Circular Head	90	9	3	-	65	6	1	-
	Curtis Island	13	1	-	-	9	-	-	-
	De Witt Island	7	-	-	-	13	1	-	-
	Hunter Island	25	3	-	-	17	1	-	-
	Huon Valley	13	1	-	-	10	-	-	-
	Kent Island Group	5	-	-	-	28	1	-	-
	King Island	284	31	7	-	617	90	37	1
	Maatsuyker Island	10	-	-	-	16	1	-	-
	Moncoeur Islands	0	-	-	-	14	2	-	-
	Reid Rock	139	46	5	-	177	77	22	-
	Rodondo Island	0	-	-	-	12	1	-	-
	Round Top Island	5	-	-	-	13	1	-	-
	Three Hummock Island	15	1	-	-	19	1	-	-
	West Coast	43	5	-	-	42	5	-	-
State Waters	Tasmania	445	51	10	1	617	95	59	1
	Victoria	1	-	-	-	40	3	-	-

*The release location resides within the receptor boundaries.

Table 11-7 Predicted minimum time to dissolved hydrocarbon exposure and maximum residence time for dissolved hydrocarbon exposure to individual receptors in the 0-10 m depth layer. Results are based on a 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill trajectories per season.

Receptor		Summer (November through to March)						Winter (April to October)					
		Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)			Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
AMP	Apollo	50	67	-	< 1	< 1	-	11	49	-	< 1	< 1	-
	Beagle	56	56	-	< 1	< 1	-	15	-	-	< 1	-	-
	Boags	28	36	-	< 1	< 1	-	12	27	-	< 1	< 1	-
	Franklin	10	13	-	< 1	< 1	-	8	9	-	< 1	< 1	-
	Nelson	-	-	-	-	-	-	30	-	-	< 1	-	-
	Tasman Fracture	25	-	-	< 1	-	-	25	-	-	< 1	-	-
	Zeehan	< 1	< 1	1	5	1	< 1	< 1	< 1	1	5	2	< 1
BIA	Antipodean Albatross - Foraging*	< 1	< 1	< 1	73	15	< 1	< 1	< 1	< 1	87	17	< 1
	Australasian Gannet - Foraging	6	12	74	< 1	< 1	< 1	5	6	-	< 1	< 1	-
	Black-browed Albatross - Foraging*	< 1	< 1	< 1	73	15	< 1	< 1	< 1	< 1	87	17	< 1
	Black-faced Cormorant - Foraging	17	25	-	< 1	< 1	-	4	4	16	1	< 1	< 1
	Bullers Albatross - Foraging*	< 1	< 1	< 1	73	15	< 1	< 1	< 1	< 1	87	17	< 1
	Campbell Albatross – Foraging*	< 1	< 1	< 1	73	15	< 1	< 1	< 1	< 1	87	17	< 1
	Common Diving-petrel – Foraging*	< 1	< 1	< 1	73	15	< 1	< 1	< 1	< 1	87	17	< 1
	Indian Yellow-nosed Albatross – Foraging*	< 1	< 1	< 1	73	15	< 1	< 1	< 1	< 1	87	17	< 1
	Little Penguin - Foraging	13	13	-	< 1	< 1	-	4	5	17	< 1	< 1	< 1
	Pygmy Blue Whale – Distribution*	< 1	< 1	< 1	73	15	< 1	< 1	< 1	< 1	87	17	< 1
	Pygmy Blue Whale – Foraging*	< 1	< 1	< 1	73	15	< 1	< 1	< 1	< 1	87	17	< 1
	Pygmy Blue Whale - Foraging (annual high use area)*	< 1	< 1	< 1	73	15	< 1	< 1	< 1	< 1	87	17	< 1
	Pygmy Blue Whale - Known Foraging Area	< 1	< 1	1	7	2	< 1	< 1	< 1	1	6	2	< 1
	Short-tailed Shearwater - Breeding	-	-	-	-	-	-	27	-	-	< 1	-	-
	Short-tailed Shearwater – Foraging*	< 1	< 1	< 1	73	15	< 1	< 1	< 1	< 1	87	17	< 1
	Shy Albatross - Breeding	34	-	-	< 1	-	-	34	-	-	< 1	-	-
	Shy Albatross – Foraging*	< 1	< 1	< 1	73	15	< 1	< 1	< 1	< 1	87	17	< 1

Receptor		Summer (November through to March)						Winter (April to October)					
		Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)			Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
	Soft-plumaged Petrel - Foraging	10	12	-	< 1	< 1	-	6	9	60	< 1	< 1	< 1
	Sooty Shearwater - Foraging	23	-	-	< 1	-	-	17	-	-	< 1	-	-
	Southern Right Whale - Connecting habitat	8	8	-	< 1	< 1	-	4	5	9	< 1	0	< 1
	Southern Right Whale - Known Core Range*	< 1	< 1	< 1	73	15	< 1	< 1	< 1	< 1	87	17	< 1
	Wandering Albatross – Foraging*	< 1	< 1	< 1	73	15	< 1	< 1	< 1	< 1	87	17	< 1
	Wedge-tailed Shearwater – Foraging*	< 1	< 1	< 1	73	15	< 1	< 1	< 1	< 1	87	17	< 1
	White Shark – Distribution*	< 1	< 1	< 1	73	15	< 1	< 1	< 1	< 1	87	17	< 1
	White Shark - Foraging	6	8	67	< 1	< 1	< 1	4	5	7	< 1	< 1	< 1
	White-faced Storm-petrel - Foraging	2	3	5	1	0	< 1	1	2	4	1	0	< 1
EEZ	Australian*	< 1	< 1	< 1	73	15	< 1	< 1	< 1	< 1	87	17	< 1
IBRA	Flinders	56	-	-	< 1	-	-	33	-	-	< 1	-	-
	King Island	8	8	-	< 1	< 1	-	4	5	52	< 1	< 1	< 1
	Tasmanian West	28	95	-	< 1	< 1	-	24	-	-	< 1	-	-
	Wilsons Promontory	-	-	-	-	-	-	15	-	-	< 1	-	-
IMCRA	Boags	25	69	-	< 1	< 1	-	16	31	-	< 1	< 1	-
	Central Bass Strait	16	30	-	< 1	< 1	-	5	8	83	< 1	< 1	< 1
	Central Victoria	-	-	-	-	-	-	18	31	-	< 1	< 1	-
	Davey	23	-	-	< 1	-	-	19	-	-	< 1	-	-
	Flinders	55	55	-	< 1	< 1	-	15	96	-	< 1	< 1	-
	Franklin	7	8	-	< 1	< 1	-	6	7	59	< 1	< 1	< 1
	Otway*	< 1	< 1	< 1	73	15	< 1	< 1	< 1	< 1	87	17	< 1
	Twofold Shelf	-	-	-	-	-	-	17	-	-	< 1	-	-
KEF	Seamounts South and east of Tasmania	-	-	-	-	-	-	44	-	-	< 1	-	-
	West Tasmania Canyons	< 1	< 1	2	3	1	< 1	< 1	< 1	2	4	1	< 1
NP	Kent Group	-	-	-	-	-	-	39	-	-	< 1	-	-
RSB	Bell Reef	14	25	-	< 1	< 1	-	7	7	-	< 1	< 1	-
	Brown Rocks	41	-	-	< 1	-	-	30	-	-	< 1	-	-

Receptor		Summer (November through to March)						Winter (April to October)					
		Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)			Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
SHORE	Albatross Island	24	78	-	< 1	< 1	-	29	-	-	< 1	-	-
	Black Pyramid	13	18	-	< 1	< 1	-	10	20	-	< 1	< 1	-
	Circular Head	25	78	-	< 1	< 1	-	19	38	-	< 1	< 1	-
	Curtis Island	56	-	-	< 1	-	-	33	-	-	< 1	-	-
	De Witt Island	-	-	-	-	-	-	30	-	-	< 1	-	-
	Hunter Island	41	-	-	< 1	-	-	27	-	-	< 1	-	-
	Huon Valley	46	-	-	< 1	-	-	24	-	-	< 1	-	-
	Kent Island Group	-	-	-	-	-	-	39	-	-	< 1	-	-
	King Island	8	8	-	< 1	< 1	-	4	5	52	< 1	< 1	< 1
	Maatsuyker Island	88	-	-	< 1	-	-	30	-	-	< 1	-	-
	Moncoeur Islands	-	-	-	-	-	-	15	-	-	< 1	-	-
	Reid Rock	13	29	-	< 1	< 1	-	7	8	-	< 1	< 1	-
	Rodondo Island	-	-	-	-	-	-	54	-	-	< 1	-	-
	Round Top Island	-	-	-	-	-	-	30	-	-	< 1	-	-
	Three Hummock Island	67	-	-	< 1	-	-	18	-	-	< 1	-	-
	West Coast	28	95	-	< 1	< 1	-	24	-	-	< 1	-	-
State Waters	Tasmania	8	8	67	< 1	< 1	< 1	3	4	7	1	< 1	< 1
	Victoria	-	-	-	-	-	-	15	-	-	< 1	-	-

*The release location resides within the receptor boundaries.

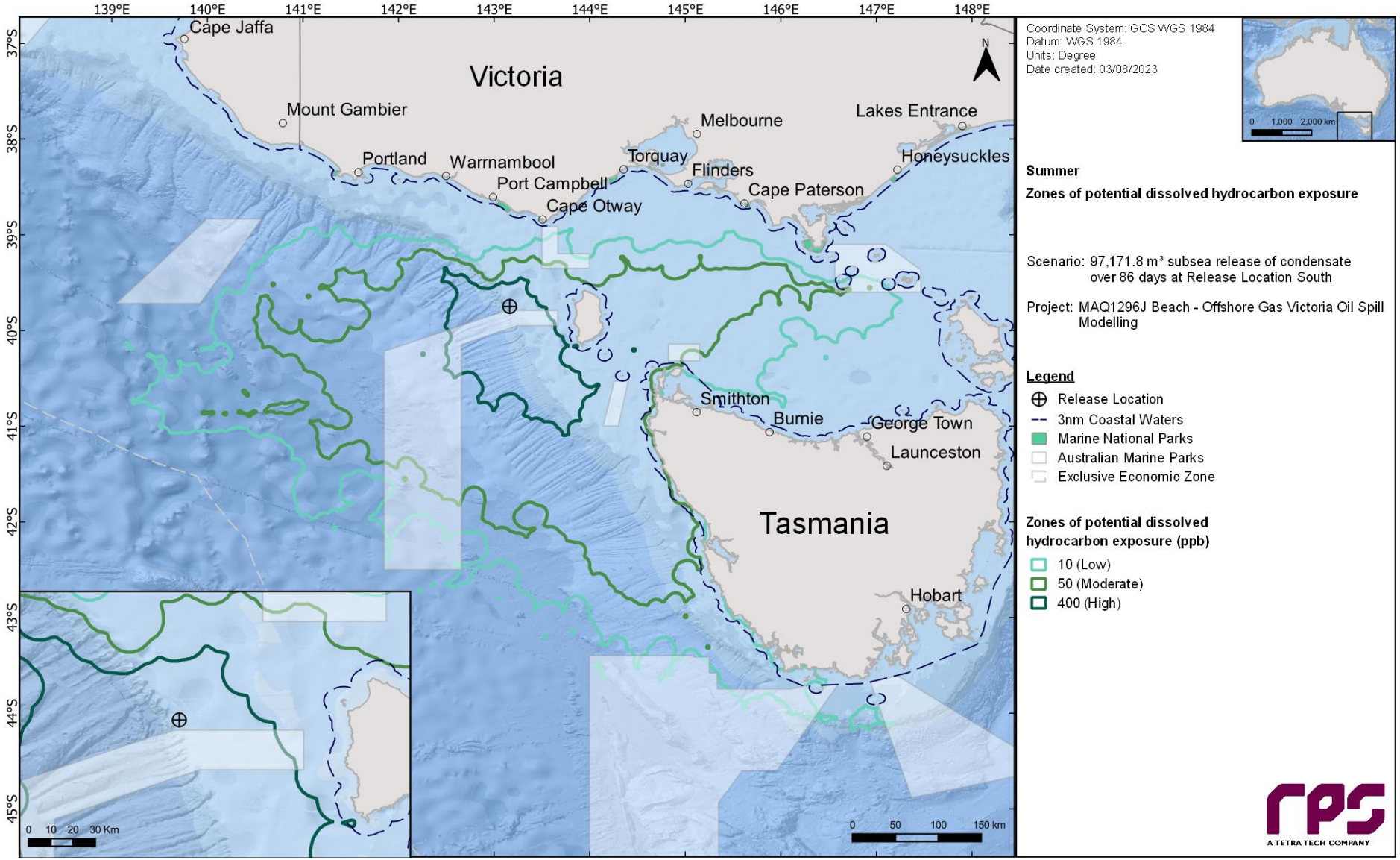

Figure 11-10 Zones of potential dissolved hydrocarbon exposure at 0-10 m below the sea in the event of a 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations during summer conditions.

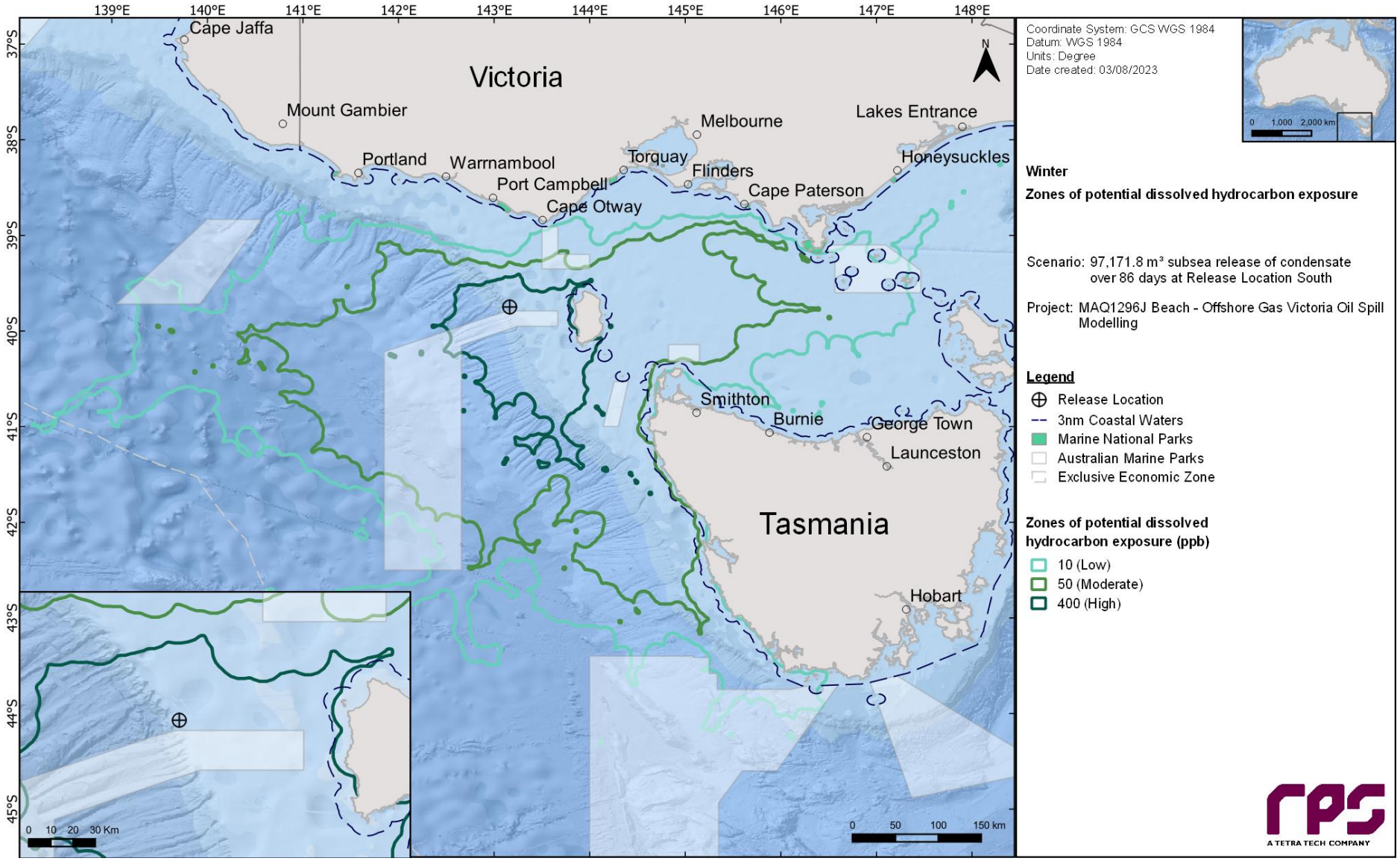

Figure 11-11 Zones of potential dissolved hydrocarbon exposure at 0-10 m below the sea in the event of a 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations during winter conditions.

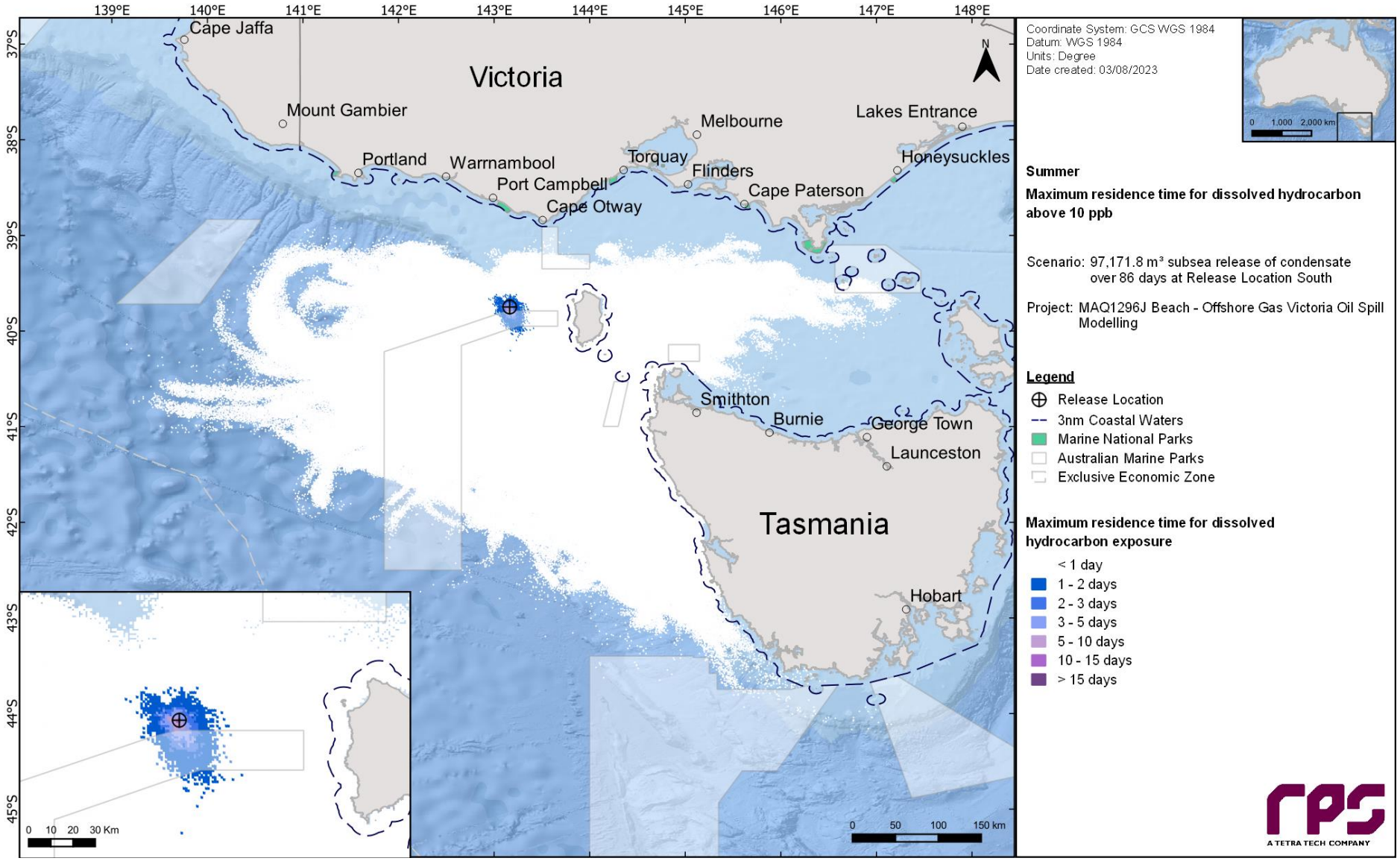

Figure 11-12 Maximum residence time for dissolved hydrocarbon exposure above 10 ppb, at 0-10 m below the sea surface in the event of a 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations during summer conditions.

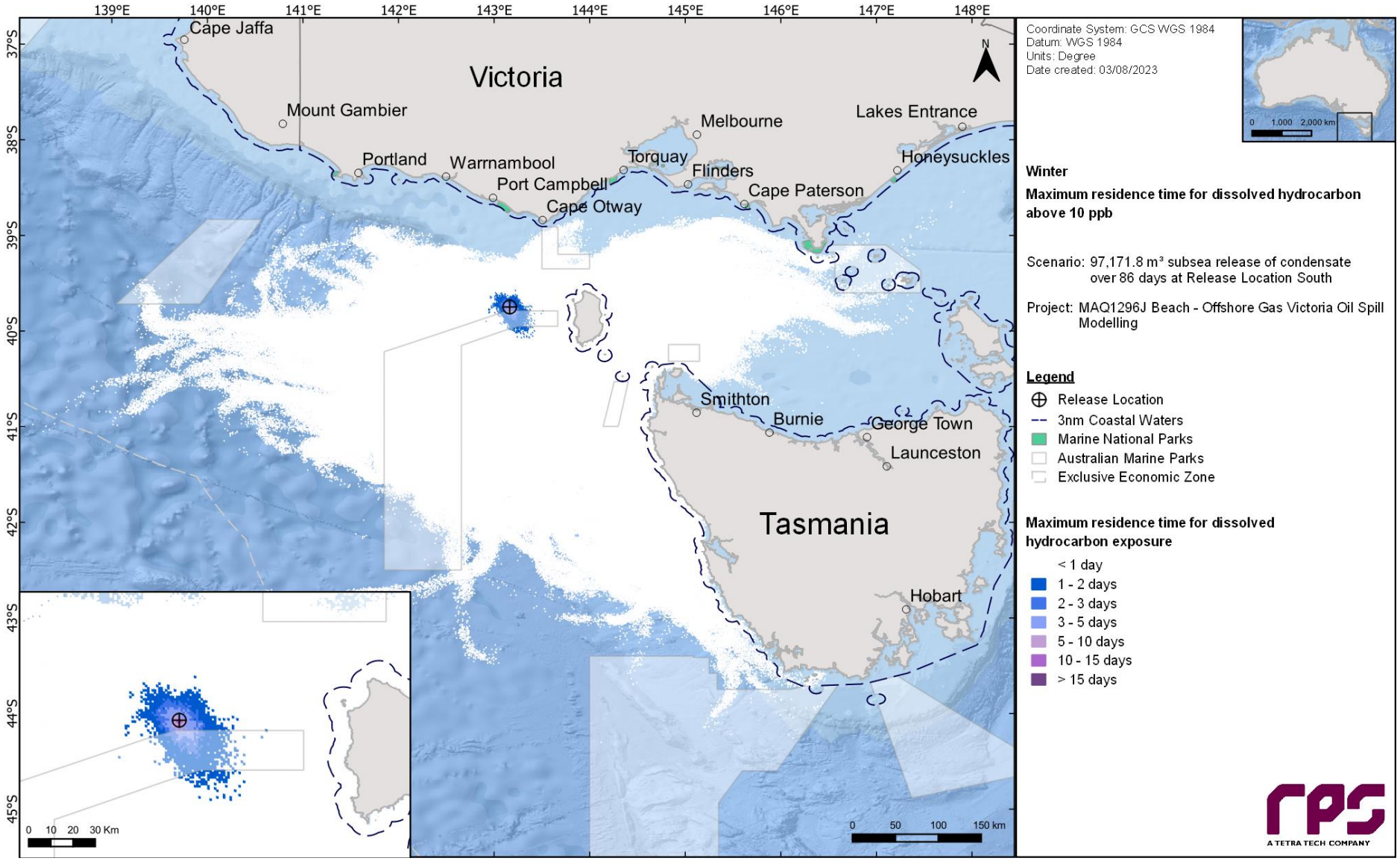

Figure 11.13 Maximum residence time for dissolved hydrocarbon exposure above 10 ppb, at 0-10 m below the sea surface in the event of a 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations during winter conditions.

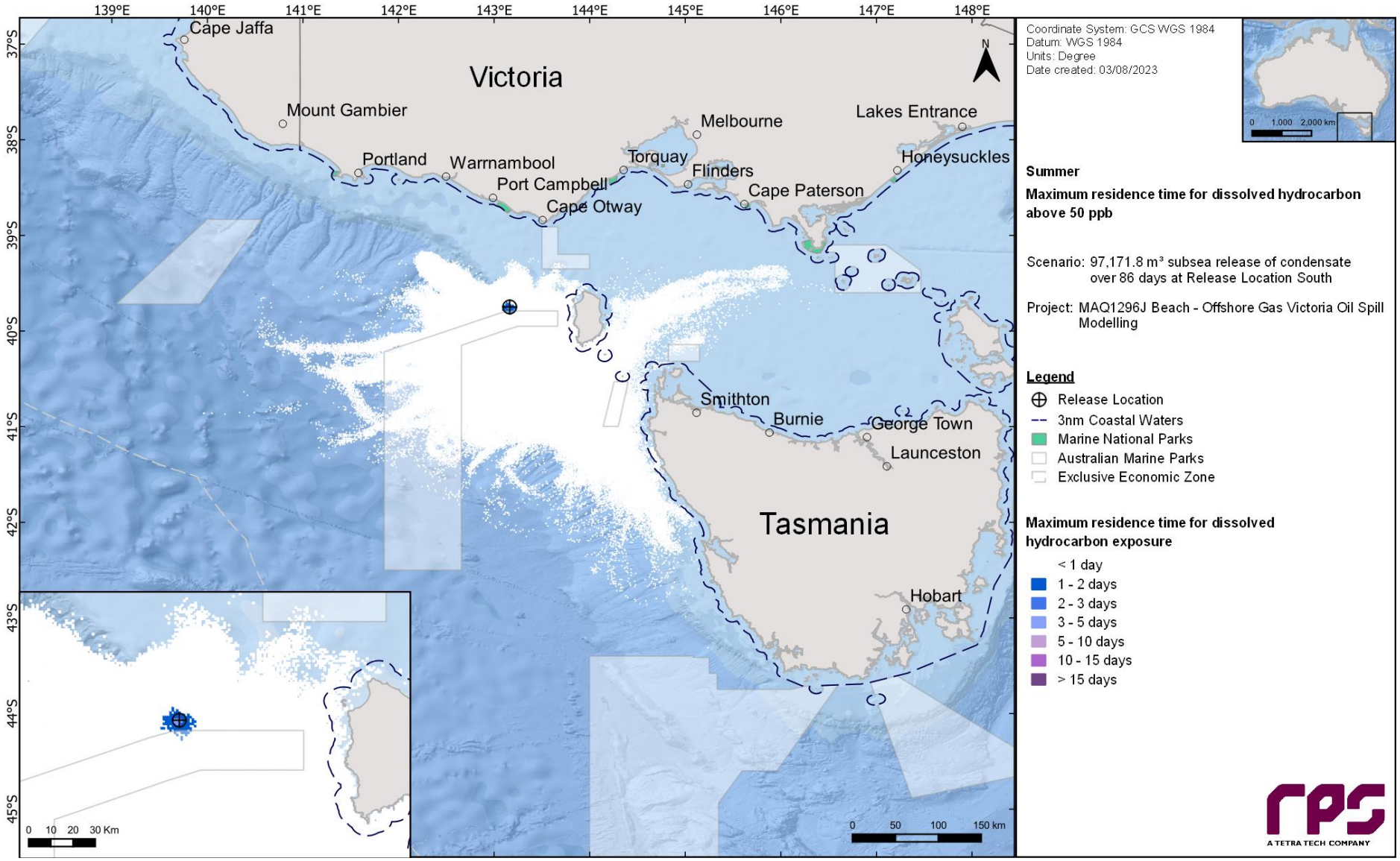

Figure 11.14 Maximum residence time for dissolved hydrocarbon exposure above 50 ppb, at 0-10 m below the sea surface in the event of a 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations during summer conditions.

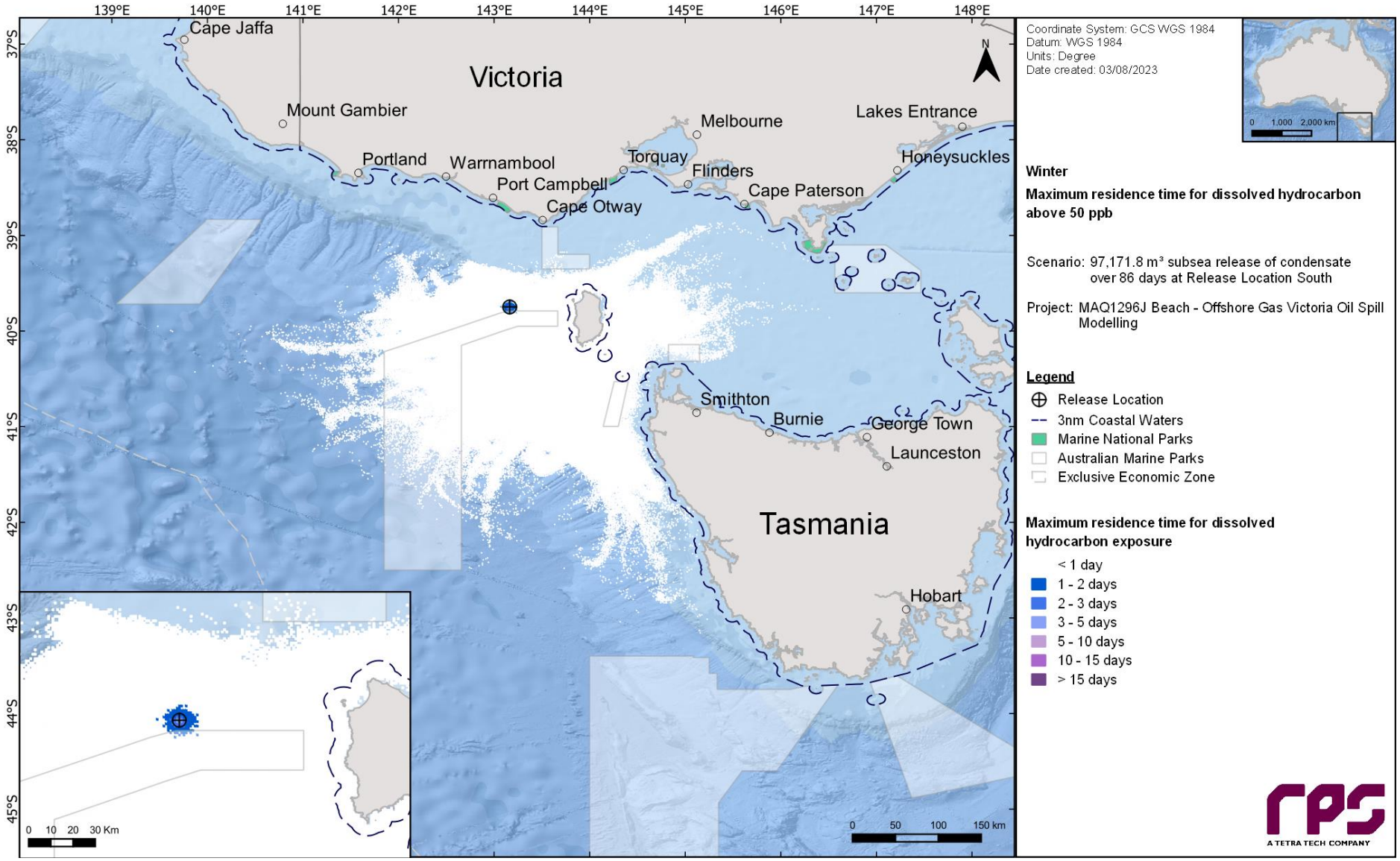

Figure 11.15 Maximum residence time for dissolved hydrocarbon exposure above 50 ppb, at 0-10 m below the sea surface in the event of a 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations during winter conditions.

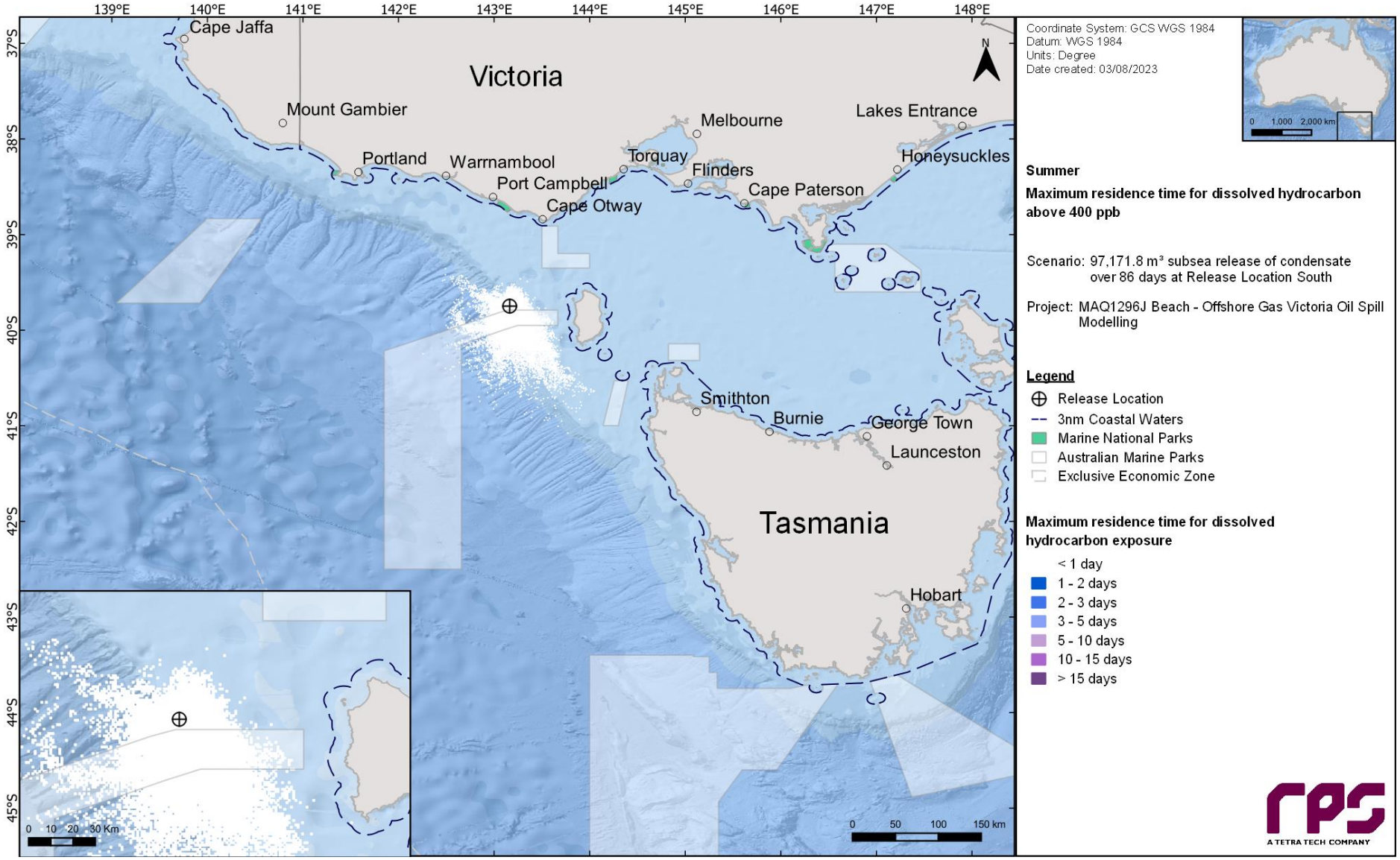

Figure 11.16 Maximum residence time for dissolved hydrocarbon exposure above 400 ppb, at 0-10 m below the sea surface in the event of a 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations during summer conditions.

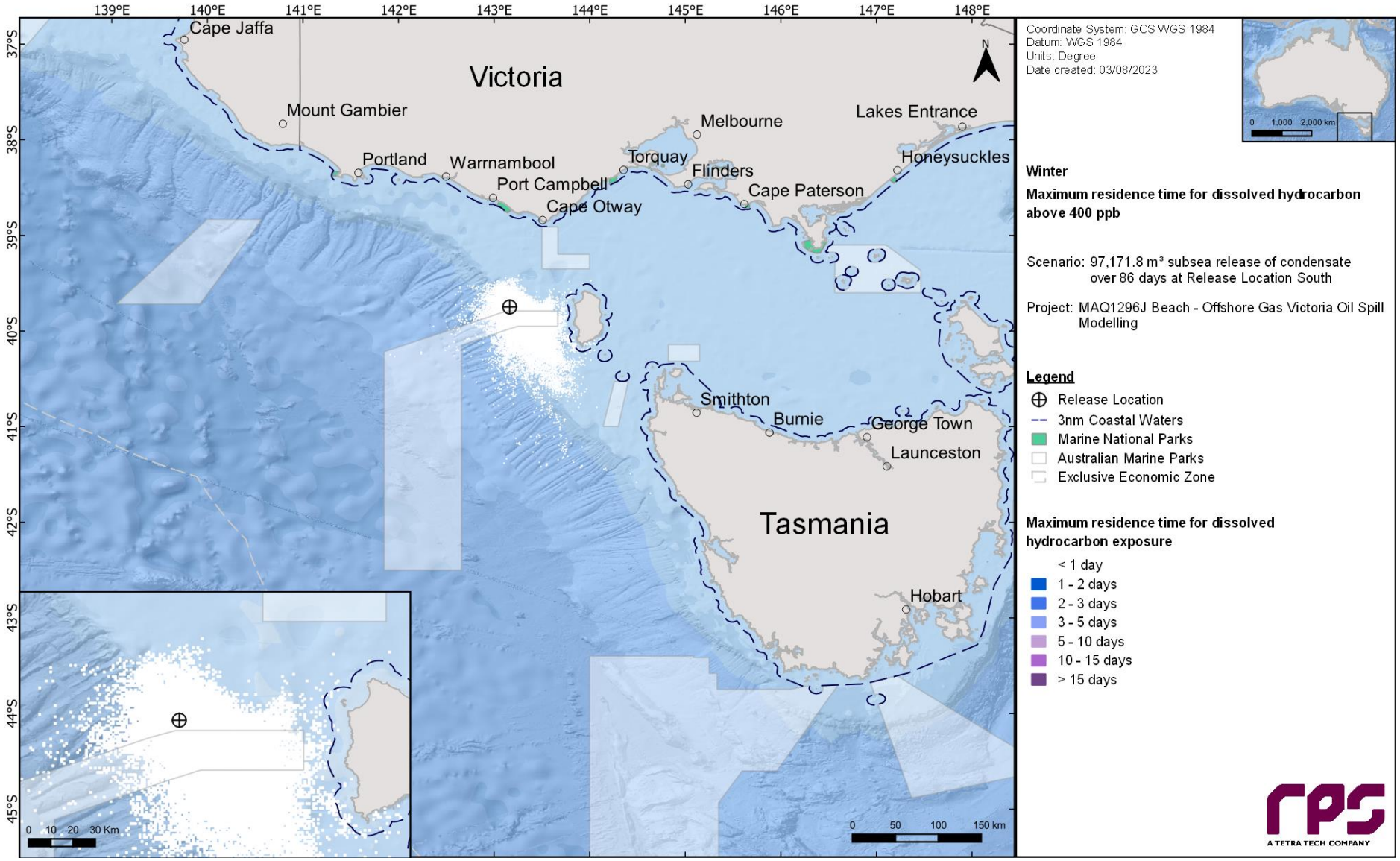

Figure 11.17 Maximum residence time for dissolved hydrocarbon exposure above 400 ppb, at 0-10 m below the sea surface in the event of a 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations during winter conditions.

11.1.4.2 Entrained Hydrocarbons

Table 11-8 presents the probability of exposure to individual receptors from entrained hydrocarbons in the 0-10 m depth layer for the summer and winter conditions.

Outside of the receptors that the Release Location South resides within (refer to Table 10-2), the highest concentration of entrained hydrocarbon was predicted for Pygmy Blue Whale - Known Foraging Area (1summer –,1,454 ppb, winter – 1,464 ppb). The same receptor, along with Pygmy Blue Whale - Known Foraging Area, White-faced Storm-petrel – Foraging and West Tasmania Canyons also presented the highest probability of low entrained hydrocarbon exposure (100% during summer and winter).

Table 11-9 presents the predicted minimum time to entrained hydrocarbon exposure and maximum residence time for entrained hydrocarbon exposure to individual receptors in the 0-10 m depth layer, for all seasonal conditions and all thresholds assessed.

Figure 11-18 and Figure 11-19 presents the zones of potential entrained hydrocarbon exposure for the 0-10 m depth layer, for each threshold assessed under summer and winter conditions, respectively.

Figure 11-20 to Figure 11-23 presents the maximum residence time of entrained hydrocarbon exposure for the NOPSEMA thresholds in summer and winter.

Table 11-8 Probability of entrained hydrocarbons exposure to marine based receptors in the 0–10 m depth layer. Results are based on a 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March)			Winter (April to October)		
		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure	
			Low	High		Low	High
AMP	Apollo	30	9	-	31	14	-
	Beagle	10	1	-	10	-	-
	Boags	15	9	-	18	10	-
	Franklin	35	65	-	36	62	-
	Tasman Fracture	11	4	-	8	-	-
	Zeehan	1,058	100	100	1,058	100	100
BIA	Antipodean Albatross - Foraging*	4,558	100	100	5,104	100	100
	Australasian Gannet - Foraging	40	88	-	59	98	-
	Black-browed Albatross - Foraging*	4,558	100	100	5,104	100	100
	Black-faced Cormorant - Foraging	85	47	-	164	96	7
	Bullers Albatross - Foraging*	4,558	100	100	5,104	100	100
	Campbell Albatross – Foraging*	4,558	100	100	5,104	100	100
	Common Diving-petrel – Foraging*	4,558	100	100	5,104	100	100
	Indian Yellow-nosed Albatross – Foraging*	4,558	100	100	5,104	100	100
	Little Penguin - Foraging	85	53	-	164	91	6
	Pygmy Blue Whale – Distribution*	4,558	100	100	5,104	100	100
	Pygmy Blue Whale – Foraging*	4,558	100	100	5,104	100	100
	Pygmy Blue Whale - Foraging (annual high use area)*	4,558	100	100	5,104	100	100
	Pygmy Blue Whale - Known Foraging Area	1,454	100	100	1,464	100	100
	Short-tailed Shearwater - Breeding	16	15	-	11	2	-
	Short-tailed Shearwater – Foraging*	4,558	100	100	5,104	100	100
	Shy Albatross - Breeding	11	4	-	9	-	-
	Shy Albatross – Foraging*	4,558	100	100	5,104	100	100
	Soft-plumaged Petrel - Foraging	29	31	-	28	16	-

Receptor		Summer (November through to March)			Winter (April to October)		
		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure	
			Low	High		Low	High
	Sooty Shearwater - Foraging	22	9	-	17	13	-
	Southern Right Whale - Connecting habitat	96	77	-	176	100	17
	Southern Right Whale - Known Core Range*	4,558	100	100	5,104	100	100
	Wandering Albatross – Foraging*	4,558	100	100	5,104	100	100
	Wedge-tailed Shearwater – Foraging*	4,558	100	100	5,104	100	100
	White Shark – Distribution*	4,558	100	100	5,104	100	100
	White Shark - Foraging	103	88	1	176	100	19
	White-faced Storm-petrel - Foraging	161	100	12	190	100	25
EEZ	Australian*	4,558	100	100	5,104	100	100
IBRA	Flinders	10	-	-	10	1	-
	King Island	96	75	-	175	100	15
	Tasmanian West	22	18	-	16	13	-
IMCRA	Boags	16	15	-	21	13	-
	Central Bass Strait	36	44	-	87	77	-
	Central Victoria	3	-	-	14	4	-
	Davey	22	9	-	17	13	-
	Flinders	11	1	-	13	3	-
	Franklin	56	84	-	38	65	-
	Otway*	4,558	100	100	5,104	100	100
	Twofold Shelf	6	-	-	10	1	-
KEF	West Tasmania Canyons	787	100	100	666	100	100
NP	Kent Group	6	-	-	11	1	-
RSB	Bell Reef	25	73	-	41	91	-
SHORE	Albatross Island	14	9	-	10	1	-
	Black Pyramid	30	42	-	29	56	-
	Circular Head	14	6	-	10	-	-
	De Witt Island	13	7	-	14	2	-
	Huon Valley	10	1	-	11	1	-

Receptor		Summer (November through to March)			Winter (April to October)		
		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure	
			Low	High		Low	High
	Kent Island Group	6	-	-	10	1	-
	King Island	96	75	-	175	100	15
	Maatsuyker Island	22	9	-	16	13	-
	Reid Rock	32	71	-	58	90	-
	Round Top Island	11	5	-	10	1	-
	West Coast	19	18	-	14	7	-
State Waters	Tasmania	103	86	1	190	100	24
	Victoria	3	-	-	11	1	-

*The release location resides within the receptor boundaries.

Table 11-9 Predicted minimum time to entrained hydrocarbon exposure and maximum residence time for entrained hydrocarbon exposure to individual receptors in the 0-10 m depth layer. Results are based on a 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill trajectories per season.

Receptor		Summer (November through to March)				Winter (April to October)			
		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)	
		Low	High	Low	High	Low	High	Low	High
AMP	Apollo	42	-	3	-	13	-	4	-
	Beagle	98	-	< 1	-	-	-	< 1	-
	Boags	47	-	< 1	-	16	-	< 1	-
	Franklin	13	-	4	-	7	-	4	-
	Tasman Fracture	49	-	< 1	-	-	-	-	-
	Zeehan	< 1	< 1	42	7	< 1	< 1	29	5
BIA	Antipodean Albatross - Foraging*	< 1	< 1	43	15	< 1	< 1	94	15
	Australasian Gannet - Foraging	6	-	6	-	5	-	8	-
	Black-browed Albatross - Foraging*	< 1	< 1	43	15	< 1	< 1	94	15
	Black-faced Cormorant - Foraging	6	-	40	-	4	13	75	1
	Bullers Albatross - Foraging*	< 1	< 1	43	15	< 1	< 1	94	15
	Campbell Albatross – Foraging*	< 1	< 1	43	15	< 1	< 1	94	15
	Common Diving-petrel – Foraging*	< 1	< 1	43	15	< 1	< 1	94	15
	Indian Yellow-nosed Albatross – Foraging*	< 1	< 1	43	15	< 1	< 1	94	15
	Little Penguin - Foraging	13	-	39	-	4	22	74	1
	Pygmy Blue Whale – Distribution*	< 1	< 1	43	15	< 1	< 1	94	15
	Pygmy Blue Whale – Foraging*	< 1	< 1	43	15	< 1	< 1	94	15
	Pygmy Blue Whale - Foraging (annual high use area)*	< 1	< 1	33	15	< 1	< 1	65	15
	Pygmy Blue Whale - Known Foraging Area	< 1	< 1	43	7	< 1	< 1	94	7
	Short-tailed Shearwater - Breeding	31	-	1	-	63	-	< 1	-
	Short-tailed Shearwater – Foraging*	< 1	< 1	43	15	< 1	< 1	94	15
	Shy Albatross - Breeding	49	-	< 1	-	-	-	-	-
	Shy Albatross – Foraging*	< 1	< 1	43	15	< 1	< 1	94	15
	Soft-plumaged Petrel - Foraging	11	-	4	-	10	-	2	-

Receptor		Summer (November through to March)				Winter (April to October)			
		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)	
		Low	High	Low	High	Low	High	Low	High
	Sooty Shearwater - Foraging	32	-	4	-	33	-	2	-
	Southern Right Whale - Connecting habitat	8	-	39	-	4	8	92	4
	Southern Right Whale - Known Core Range*	< 1	< 1	40	15	< 1	< 1	94	15
	Wandering Albatross – Foraging*	< 1	< 1	43	15	< 1	< 1	94	15
	Wedge-tailed Shearwater – Foraging*	< 1	< 1	43	15	< 1	< 1	77	15
	White Shark – Distribution*	< 1	< 1	43	15	< 1	< 1	94	15
	White Shark - Foraging	4	34	19	< 1	4	6	57	2
	White-faced Storm-petrel - Foraging	2	7	40	< 1	1	3	94	4
EEZ	Australian*	< 1	< 1	43	15	< 1	< 1	94	15
IBRA	Flinders	-	-	-	-	59	-	0	-
	King Island	8	-	39	-	4	8	89	4
	Tasmanian West	30	-	4	-	27	-	2	-
IMCRA	Boags	35	-	< 1	-	16	-	< 1	-
	Central Bass Strait	14	-	2	-	4	-	5	-
	Central Victoria	-	-	-	-	29	-	< 1	-
	Davey	32	-	4	-	35	-	2	-
	Flinders	67	-	< 1	-	30	-	< 1	-
	Franklin	9	-	4	-	7	-	4	-
	Otway*	< 1	< 1	40	15	< 1	< 1	94	15
	Twofold Shelf	-	-	-	-	59	-	< 1	-
KEF	West Tasmania Canyons	< 1	< 1	34	5	< 1	< 1	21	3
NP	Kent Group	-	-	-	-	59	-	< 1	-
RSB	Bell Reef	12	-	2	-	6	-	3	-
SHORE	Albatross Island	46	-	< 1	-	46	-	< 1	-
	Black Pyramid	14	-	1	-	10	-	2	-
	Circular Head	58	-	< 1	-	-	-	-	-
	De Witt Island	49	-	< 1	-	65	-	< 1	-
	Huon Valley	97	-	< 1	-	39	-	< 1	-

Receptor		Summer (November through to March)				Winter (April to October)			
		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)	
		Low	High	Low	High	Low	High	Low	High
	Kent Island Group	-	-	-	-	59	-	< 1	-
	King Island	8	-	39	-	4	9	89	4
	Maatsuyker Island	32	-	4	-	38	-	2	-
	Reid Rock	12	-	3	-	6	-	3	-
	Round Top Island	50	-	< 1	-	66	-	< 1	-
	West Coast	30	-	3	-	27	-	< 1	-
State Waters	Tasmania	7	34	40	< 1	3	6	94	4
	Victoria	-	-	-	-	35	-	< 1	-

*The release location resides within the receptor boundaries.

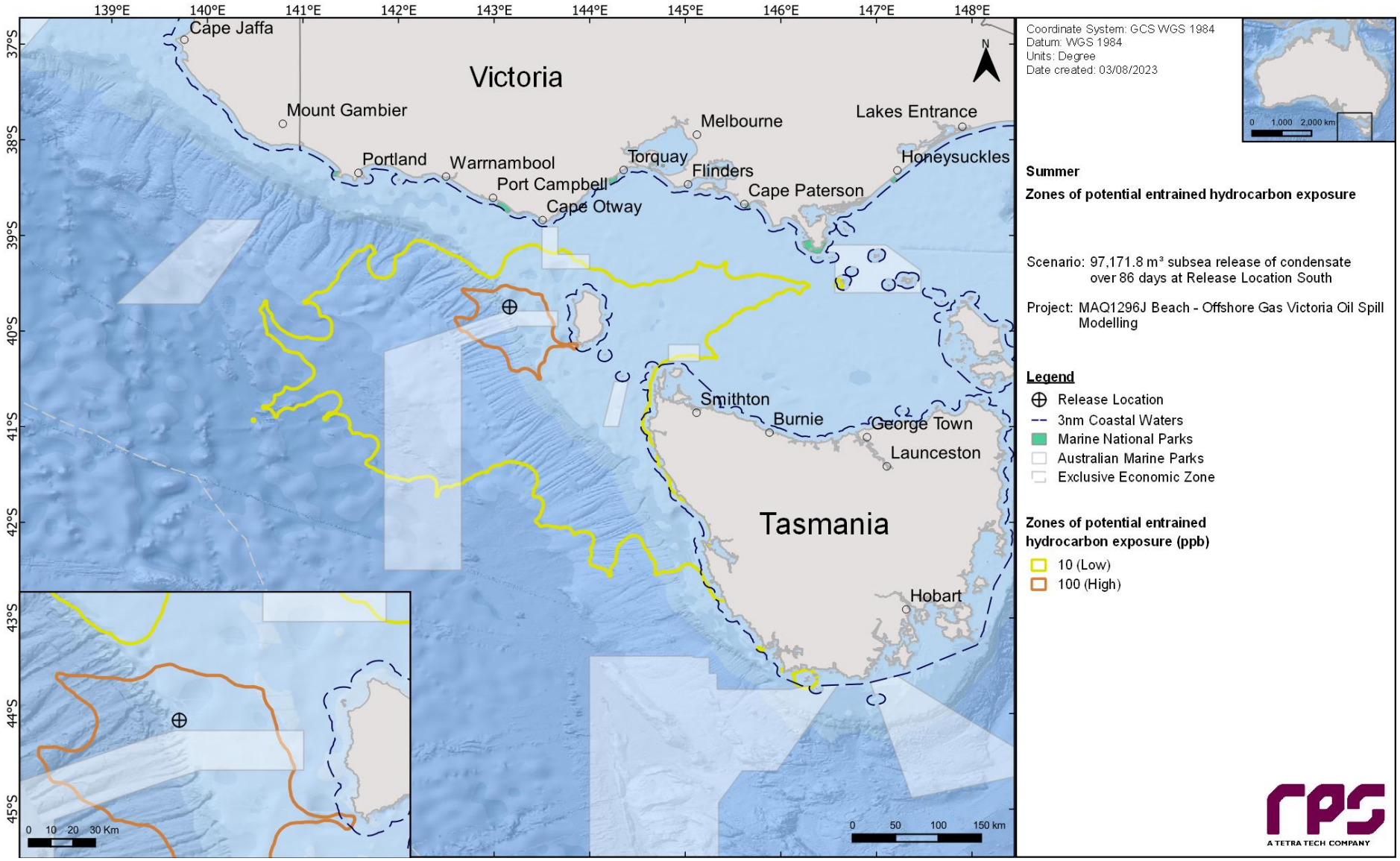

Figure 11-18 Zones of potential entrained hydrocarbon exposure at 0-10 m below the sea surface in the event of a 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations during summer conditions.

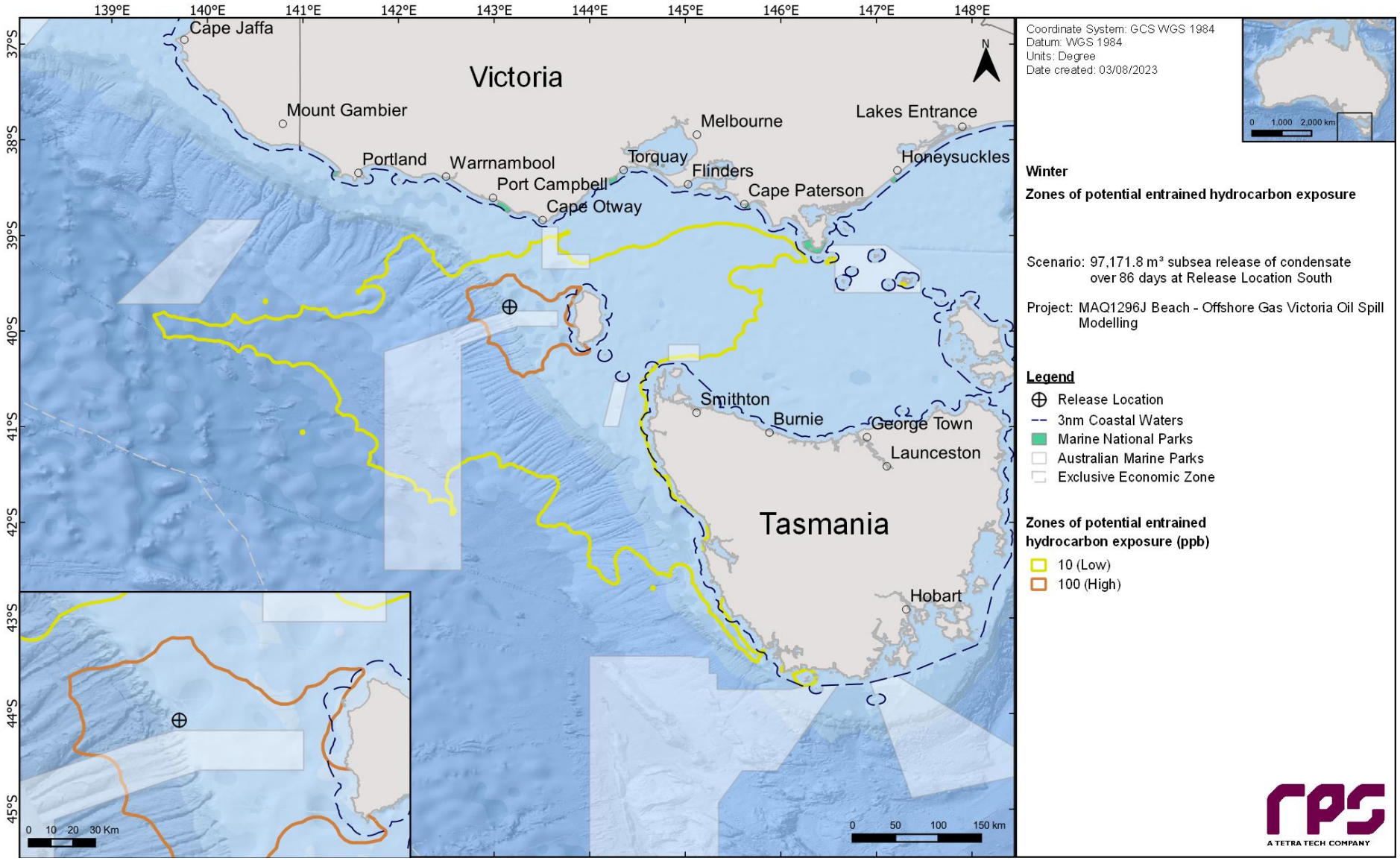

Figure 11-19 Zones of potential entrained hydrocarbon exposure at 0-10 m below the sea surface in the event of a 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations during winter conditions.

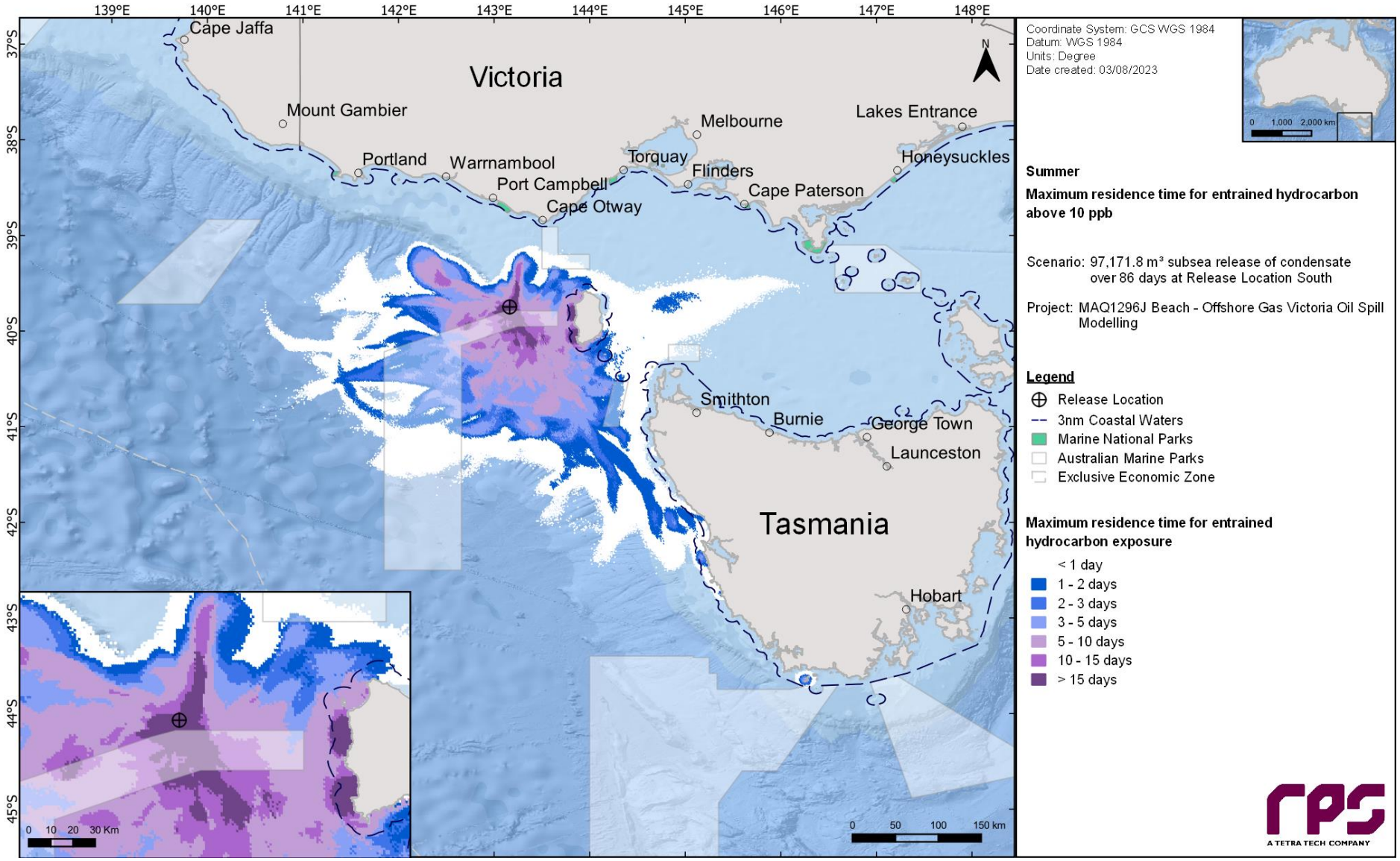

Figure 11-20 Maximum residence time for entrained hydrocarbon exposure above 10 ppb, at 0-10 m below the sea surface in the event of a 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations during summer conditions.

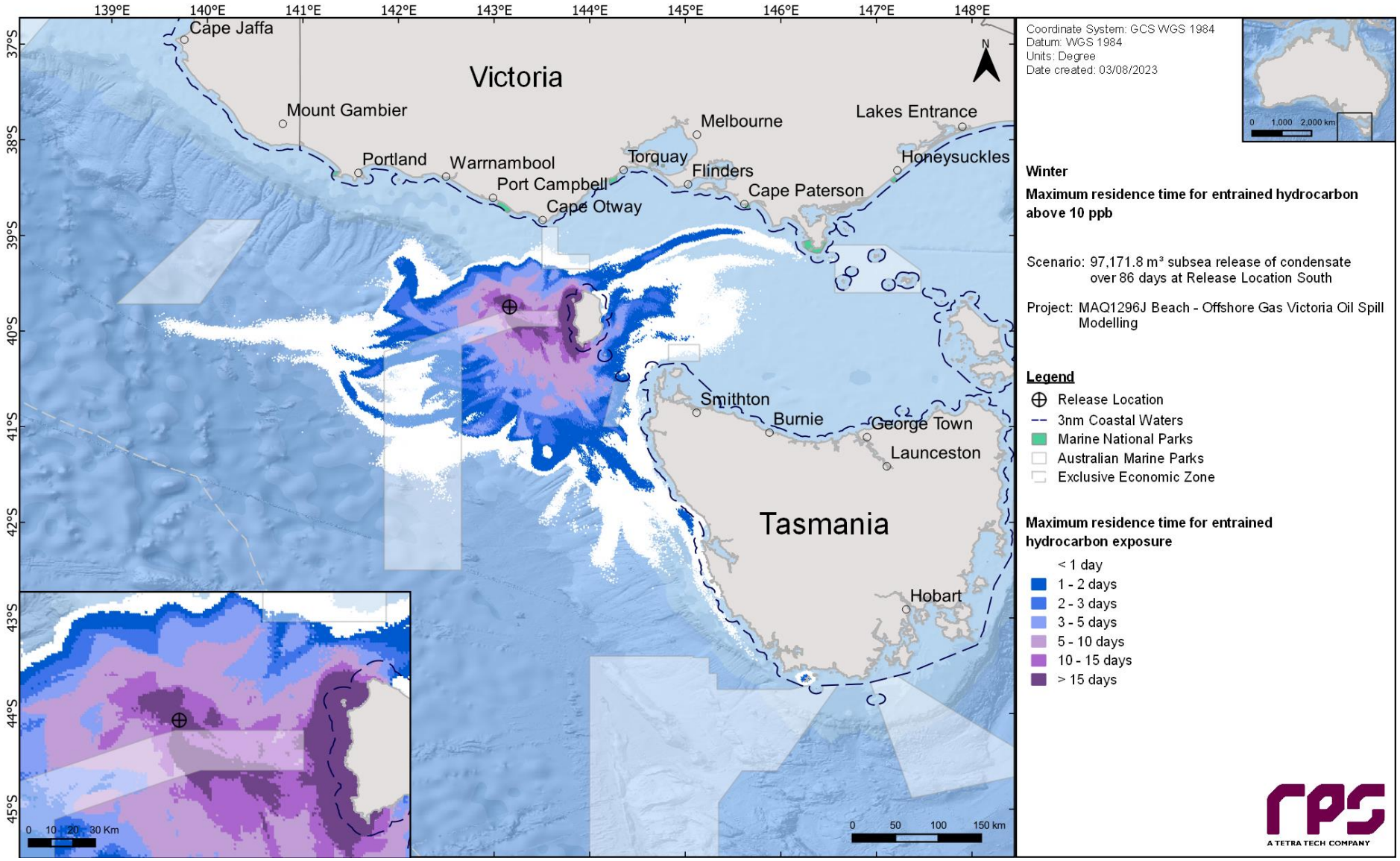

Figure 11-21 Maximum residence time for entrained hydrocarbon exposure above 10 ppb, at 0-10 m below the sea surface in the event of a 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations during winter conditions.

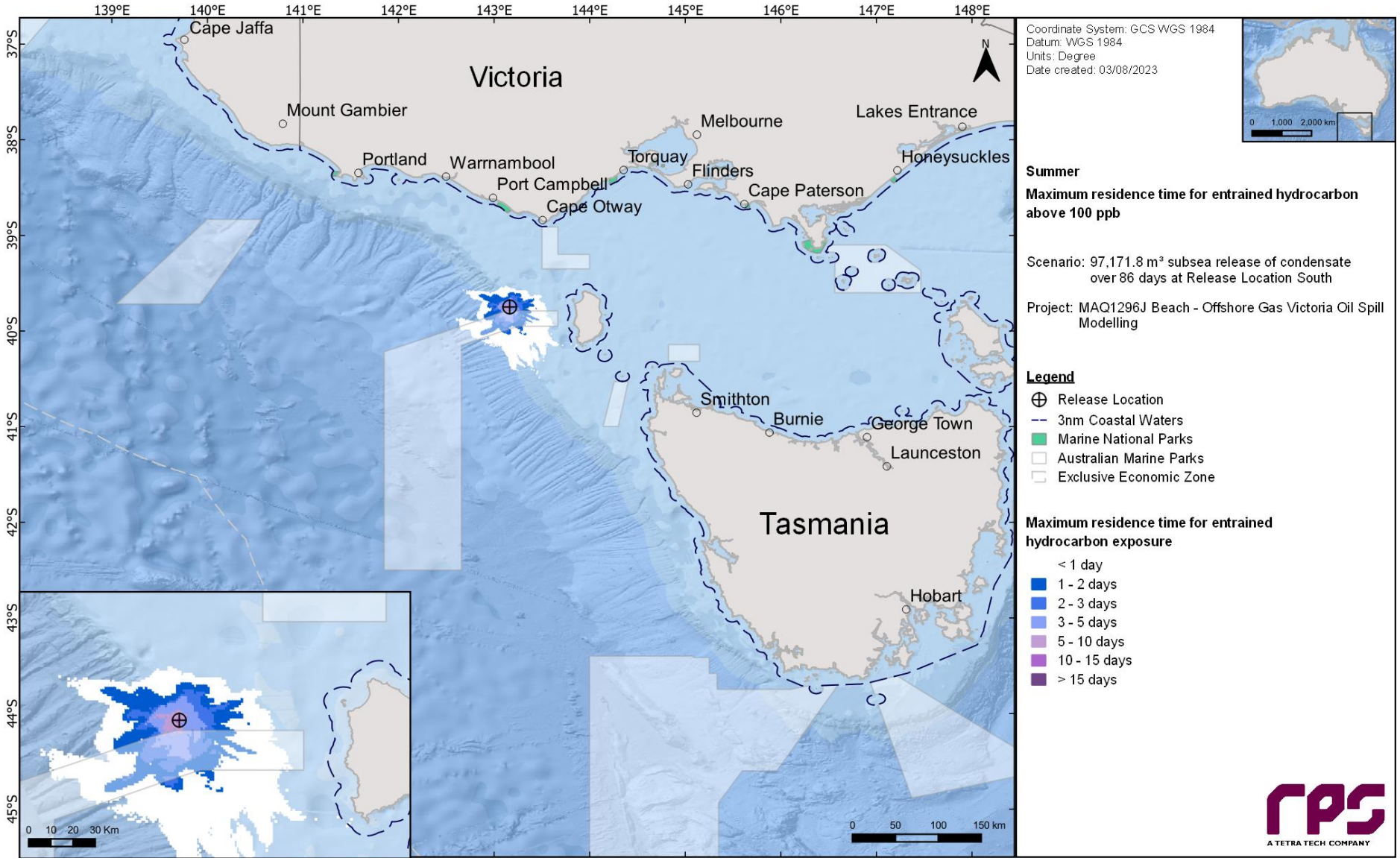

Figure 11-22 Maximum residence time for entrained hydrocarbon exposure above 100 ppb, at 0-10 m below the sea surface in the event of a 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations during summer conditions.

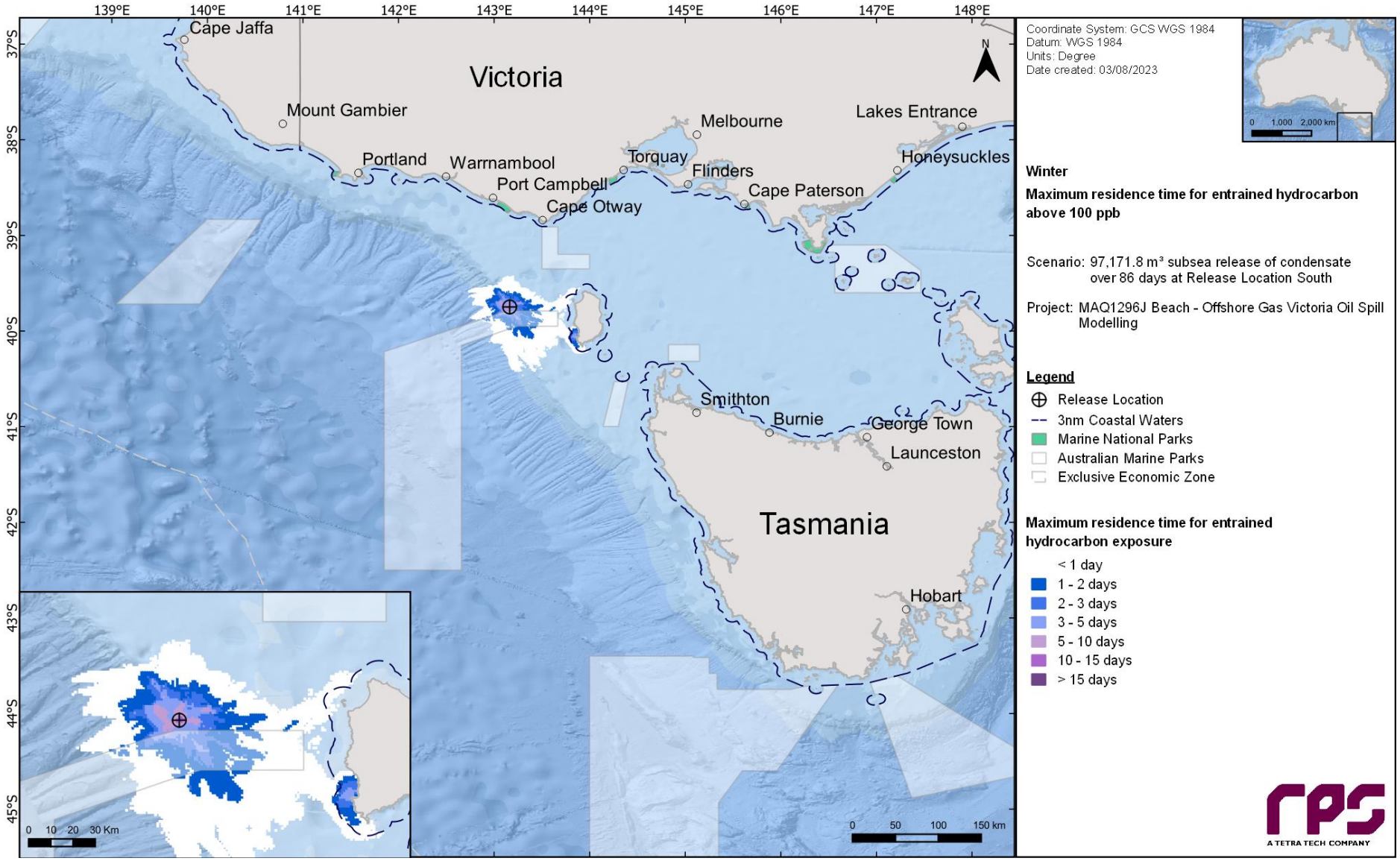

Figure 11-23 Maximum residence time for entrained hydrocarbon exposure above 100 ppb, at 0-10 m below the sea surface in the event of a 97,171.8 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location South. The results were calculated from 100 spill simulations during winter conditions.

12 RESULTS – LOSS OF CONTAINMENT FROM VESSEL COLLISION AT THE RELEASE LOCATION SOUTH FIELD

This scenario examined a 603.7 m^3 surface release of marine diesel from a loss of containment from a vessel collision at the Release Location South field. A total of 200 spill simulations were run (i.e., 100 spills per season) and tracked for 30 days. The results for all 100 simulations per season were combined and are presented on a seasonal basis (i.e., summer and winter).

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12.1 Stochastic Analysis

12.1.1 Area of Exposure

Figure 12-1 presents the combined area of potential exposure for surface, shoreline, entrained and dissolved, by overlaying the results from all 200 simulations (i.e., 100 per season) during summer and winter conditions.

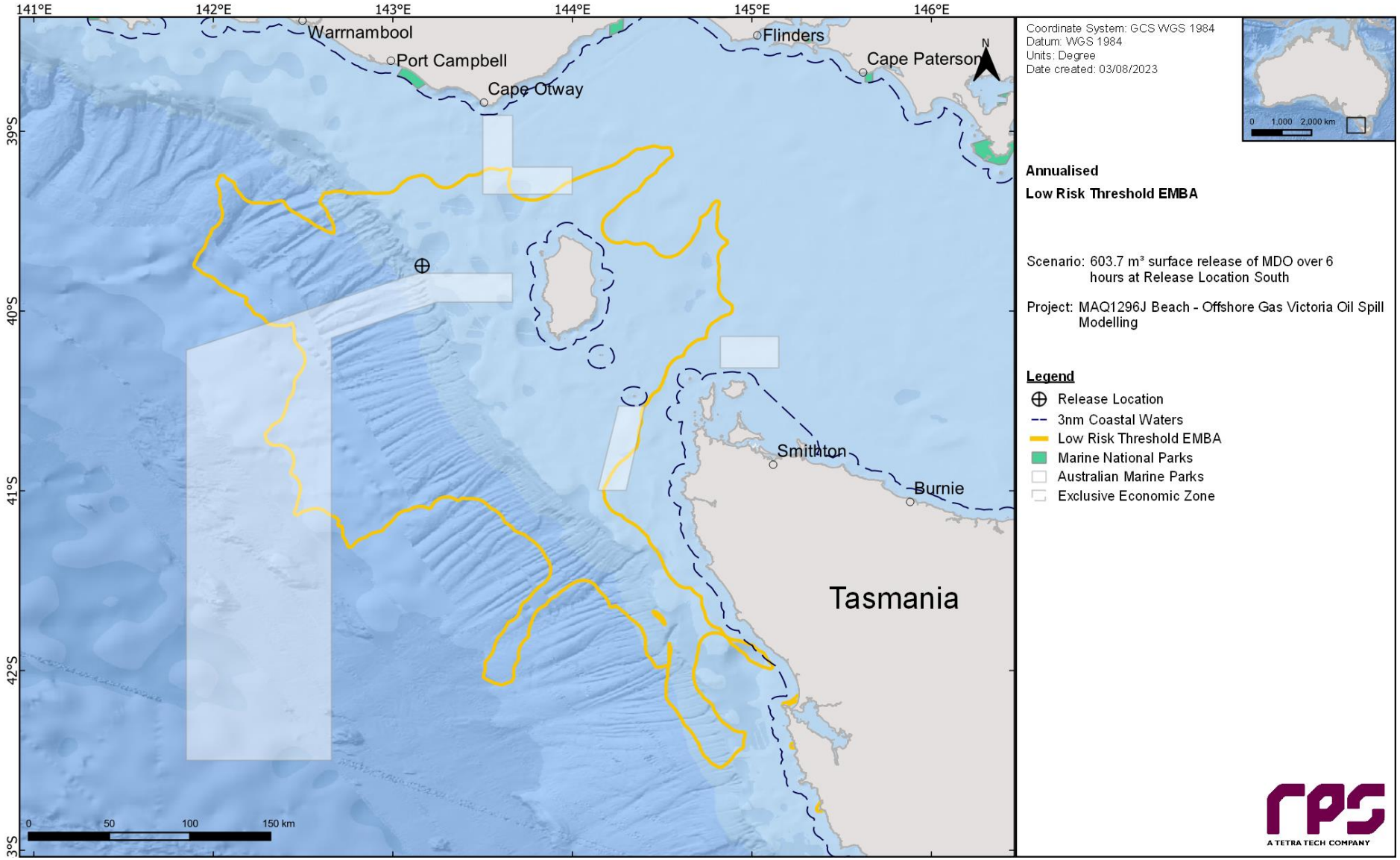

Figure 12-1 Predicted area of exposure for low thresholds produced by overlaying the results from all 200 simulations, resulting from a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field during summer and winter conditions.

12.1.2 Floating Oil Exposure

Table 12-1 summarises the maximum distance travelled by floating oil on the sea surface at each threshold. The maximum distance from the release location to the low (1–10 g/m^2), moderate (10–50 g/m^2) and high (> 50g/ m^2) exposure zones was 57 km (south-southeast) during winter conditions, and 48 km (south-southeast) during winter conditions and 8 km (south-southeast) during both seasons respectively.

Table 12-2 summarises the potential floating oil exposure to individual receptors during the summer and winter conditions. Outside of the receptors that the Release Location South resides within (refer to Table 10-2), floating oil exposure above the low threshold was predicted at the Zeehan AMP (38% summer and 39% winter) Pygmy Blue Whale - Known Foraging Area BIA (52% summer and 50% winter) and the West Tasmania Canyons KEF (13% summer and 15% winter).

Table 12-3 presents the maximum residence time of floating oil exposure for each individual grid cell within each individual receptor during summer and winter.

Figure 12-2 and Figure 12-3 present the zones of potential floating oil exposure for all thresholds under summer and winter conditions, respectively.

Figure 12-4 to Figure 12-9 present the maximum residence time of floating oil exposure for the NOPSEMA thresholds during summer and winter, respectively.

Table 12-1 Maximum distance and direction from the release location to the edge of floating oil exposure. Results are based on a 603.7 m^3 surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations per season.

Season	Distance and direction travelled	Zones of potential floating oil exposure		
		Low	Moderate	High
Summer	Maximum distance (km) from release location	31	24	8
	Maximum distance (km) from release location (99th percentile)	29	23	8
	Direction	SE	SSE	SSE
Winter	Maximum distance (km) from release location	57	48	8
	Maximum distance (km) from release location (99th percentile)	54	46	8
	Direction	SSE	SSE	SSE

Table 12-2 Summary of the potential floating oil exposure to individual receptors. Results are based on a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March)						Winter (April to October)					
		Probability of floating oil exposure (%)			Minimum time before floating oil exposure (days)			Probability of floating oil exposure (%)			Minimum time before floating oil exposure (days)		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
AMP	Zeehan	38	12	4	< 1	< 1	< 1	39	16	3	< 1	< 1	< 1
BIA	Antipodean Albatross - Foraging*	100	100	71	< 1	< 1	< 1	100	100	64	< 1	< 1	< 1
	Black-browed Albatross - Foraging*	100	100	71	< 1	< 1	< 1	100	100	64	< 1	< 1	< 1
	Bullers Albatross - Foraging*	100	100	71	< 1	< 1	< 1	100	100	64	< 1	< 1	< 1
	Campbell Albatross – Foraging*	100	100	71	< 1	< 1	< 1	100	100	64	< 1	< 1	< 1
	Common Diving-petrel – Foraging*	100	100	71	< 1	< 1	< 1	100	100	64	< 1	< 1	< 1
	Indian Yellow-nosed Albatross – Foraging*	100	100	71	< 1	< 1	< 1	100	100	64	< 1	< 1	< 1
	Pygmy Blue Whale – Distribution*	100	100	71	< 1	< 1	< 1	100	100	64	< 1	< 1	< 1
	Pygmy Blue Whale – Foraging*	100	100	71	< 1	< 1	< 1	100	100	64	< 1	< 1	< 1
	Pygmy Blue Whale - Foraging (annual high use area)*	100	100	71	< 1	< 1	< 1	100	100	64	< 1	< 1	< 1
	Pygmy Blue Whale - Known Foraging Area	52	19	8	< 1	< 1	< 1	50	26	8	< 1	< 1	< 1
	Short-tailed Shearwater – Foraging*	100	100	71	< 1	< 1	< 1	100	100	64	< 1	< 1	< 1
	Shy Albatross – Foraging*	100	100	71	< 1	< 1	< 1	100	100	64	< 1	< 1	< 1
	Southern Right Whale - Known Core Range*	100	100	71	< 1	< 1	< 1	100	100	64	< 1	< 1	< 1
	Wandering Albatross – Foraging*	100	100	71	< 1	< 1	< 1	100	100	64	< 1	< 1	< 1
	Wedge-tailed Shearwater – Foraging*	100	100	71	< 1	< 1	< 1	100	100	64	< 1	< 1	< 1
	White Shark – Distribution*	100	100	71	< 1	< 1	< 1	100	100	64	< 1	< 1	< 1
EEZ	Australian*	100	100	71	< 1	< 1	< 1	100	100	64	< 1	< 1	< 1
IMCRA	Otway*	100	100	71	< 1	< 1	< 1	100	100	64	< 1	< 1	< 1
KEF	West Tasmania Canyons	13	4	-	< 1	< 1	-	15	5	-	< 1	< 1	-

*The release location resides within the receptor boundaries.

Table 12-3 Summary of the maximum residence time of floating oil exposure for each individual grid cell within each individual receptor. Results are based on a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March) Maximum residence time of floating oil exposure (days)			Winter (April to October) Maximum residence time of floating oil exposure (days)		
		Low	Moderate	High	Low	Moderate	High
AMP	Zeehan	1	< 1	< 1	1	< 1	< 1
BIA	Antipodean Albatross - Foraging*	2	2	1	1	1	< 1
	Black-browed Albatross - Foraging*	2	2	1	1	1	< 1
	Bullers Albatross - Foraging*	2	2	1	1	1	< 1
	Campbell Albatross – Foraging*	2	2	1	1	1	< 1
	Common Diving-petrel – Foraging*	2	2	1	1	1	< 1
	Indian Yellow-nosed Albatross – Foraging*	2	2	1	1	1	< 1
	Pygmy Blue Whale – Distribution*	2	2	1	1	1	< 1
	Pygmy Blue Whale – Foraging*	2	2	1	1	1	< 1
	Pygmy Blue Whale - Foraging (annual high use area)*	2	2	1	1	1	< 1
	Pygmy Blue Whale - Known Foraging Area	1	< 1	< 1	1	1	< 1
	Short-tailed Shearwater – Foraging*	2	2	1	1	1	< 1
	Shy Albatross – Foraging*	2	2	1	1	1	< 1
	Southern Right Whale - Known Core Range*	2	2	1	1	1	< 1
	Wandering Albatross – Foraging*	2	2	1	1	1	< 1
	Wedge-tailed Shearwater – Foraging*	2	2	1	1	1	< 1
	White Shark – Distribution*	2	2	1	1	1	< 1
EEZ	Australian*	2	2	1	1	1	< 1
IMCRA	Otway*	2	2	1	1	1	< 1
KEF	West Tasmania Canyons	< 1	< 1	-	< 1	< 1	-

*The release location resides within the receptor boundaries.

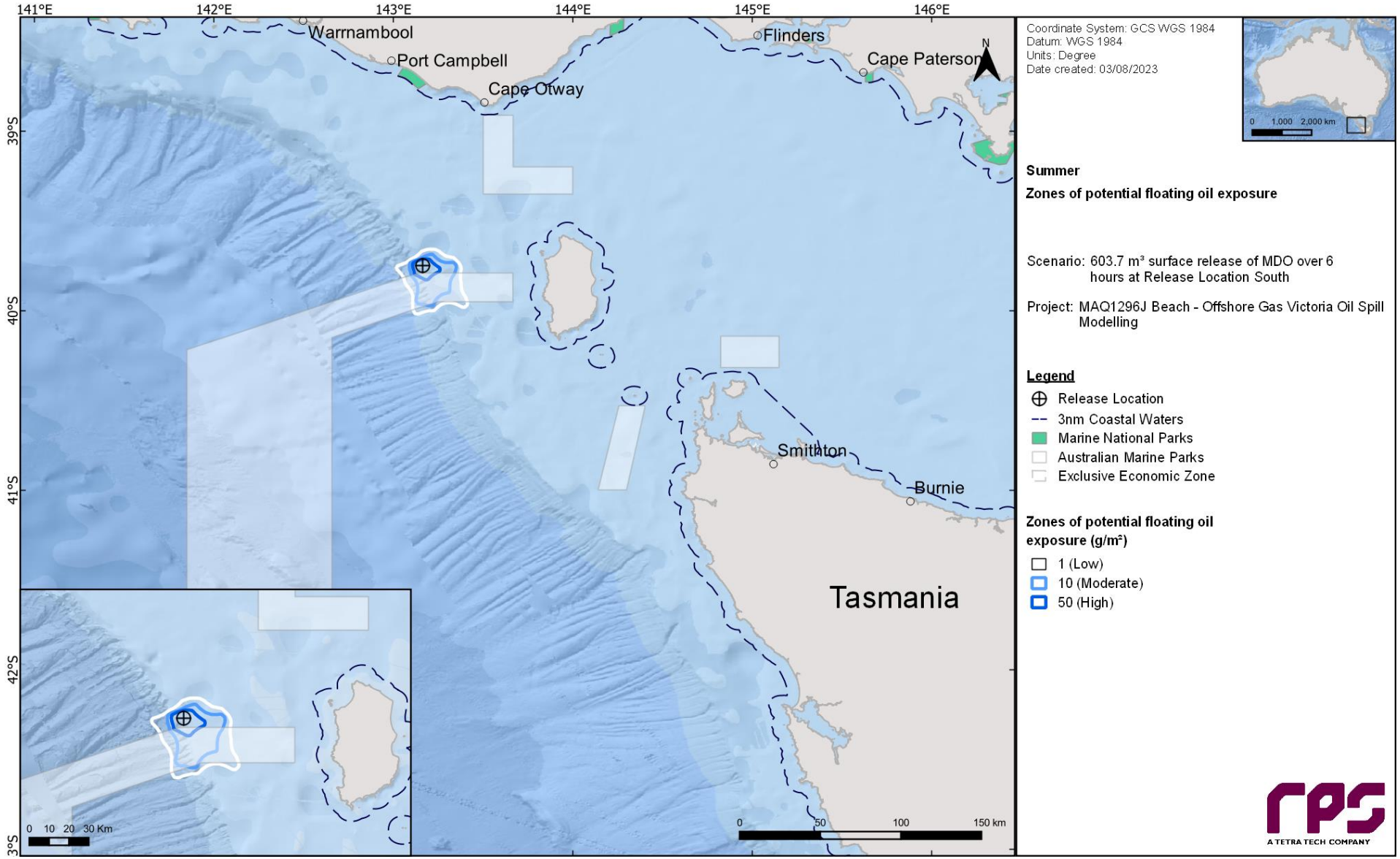

Figure 12-2 Zones of potential floating oil exposure in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations during summer conditions.

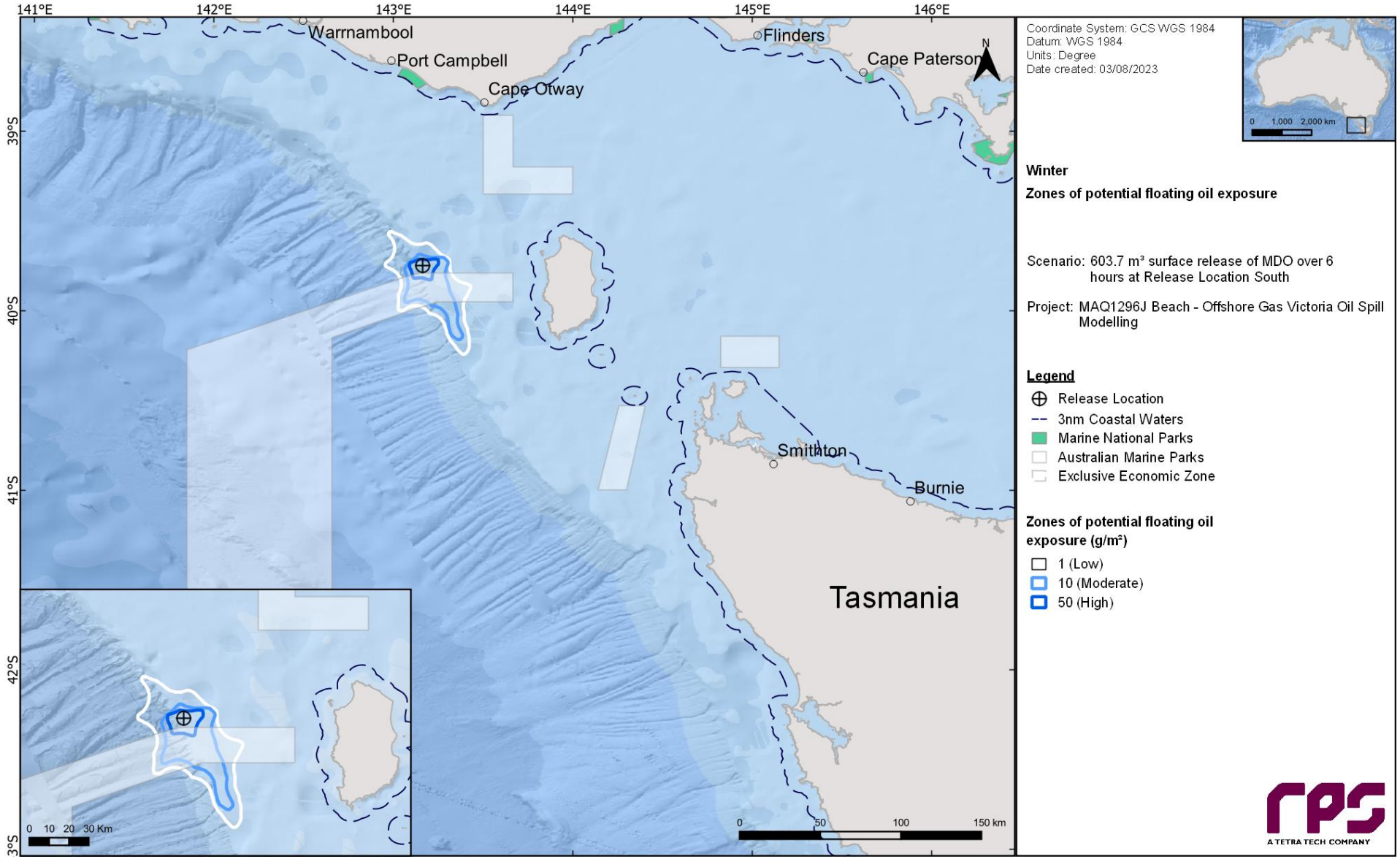

Figure 12-3 Zones of potential floating oil exposure in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations during winter conditions.

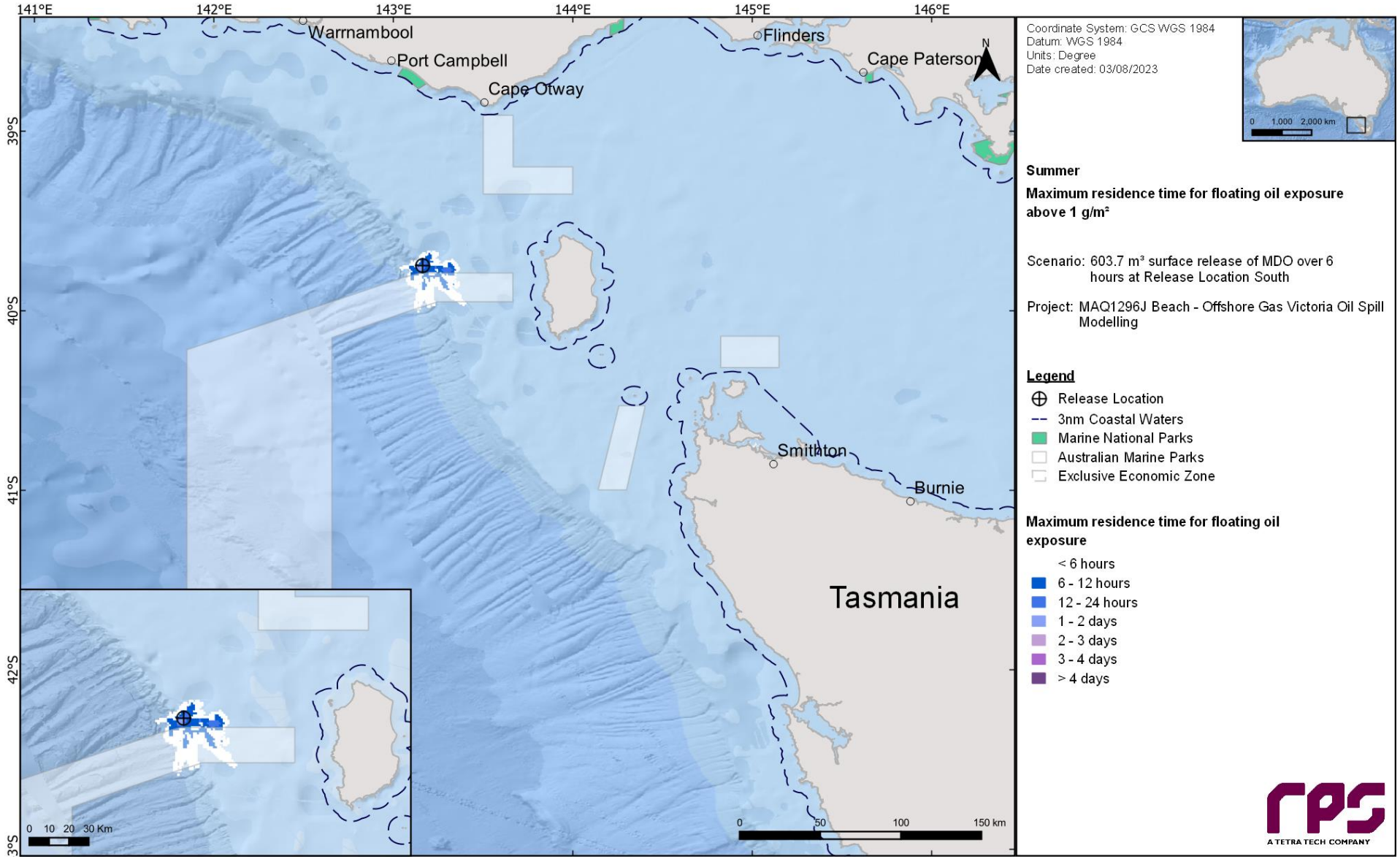

Figure 12-4 Maximum residence time of floating oil exposure above 1 g/m², in the event of 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations during summer conditions.

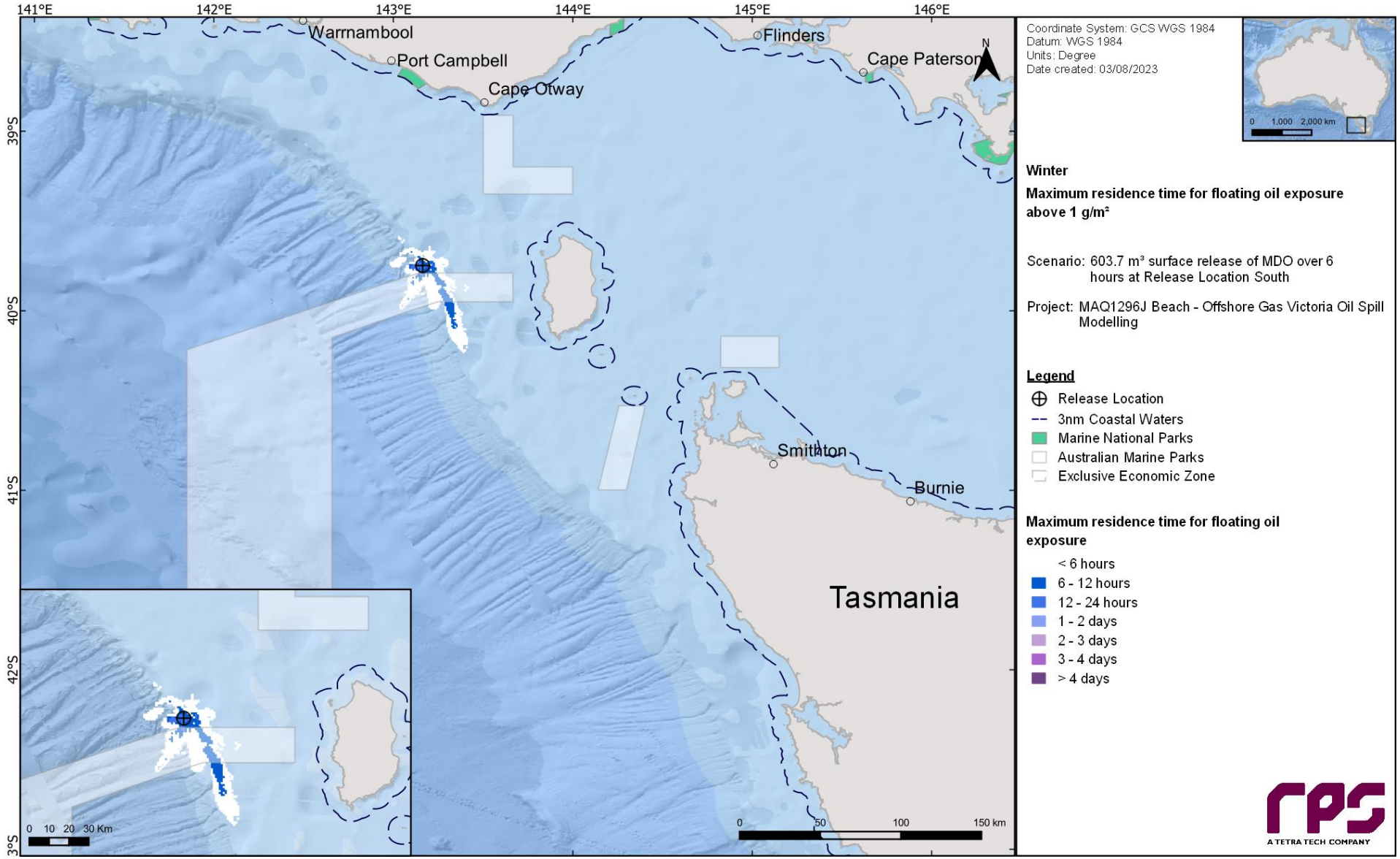

Figure 12-5 Maximum residence time of floating oil exposure above 1 g/m², in the event of 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations during winter conditions.

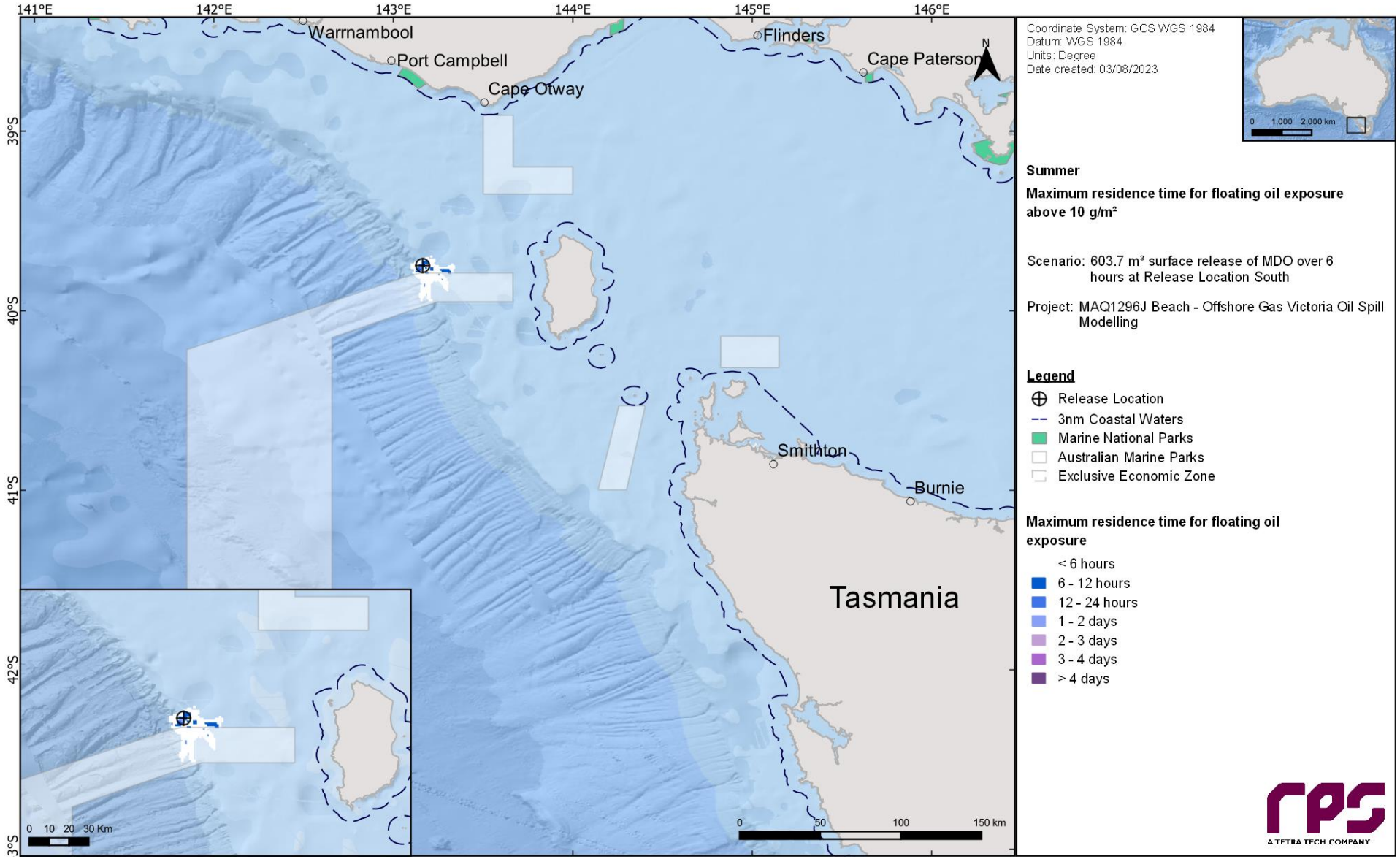

Figure 12-6 Maximum residence time of floating oil exposure above 10 g/m², in the event of 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations during summer conditions.

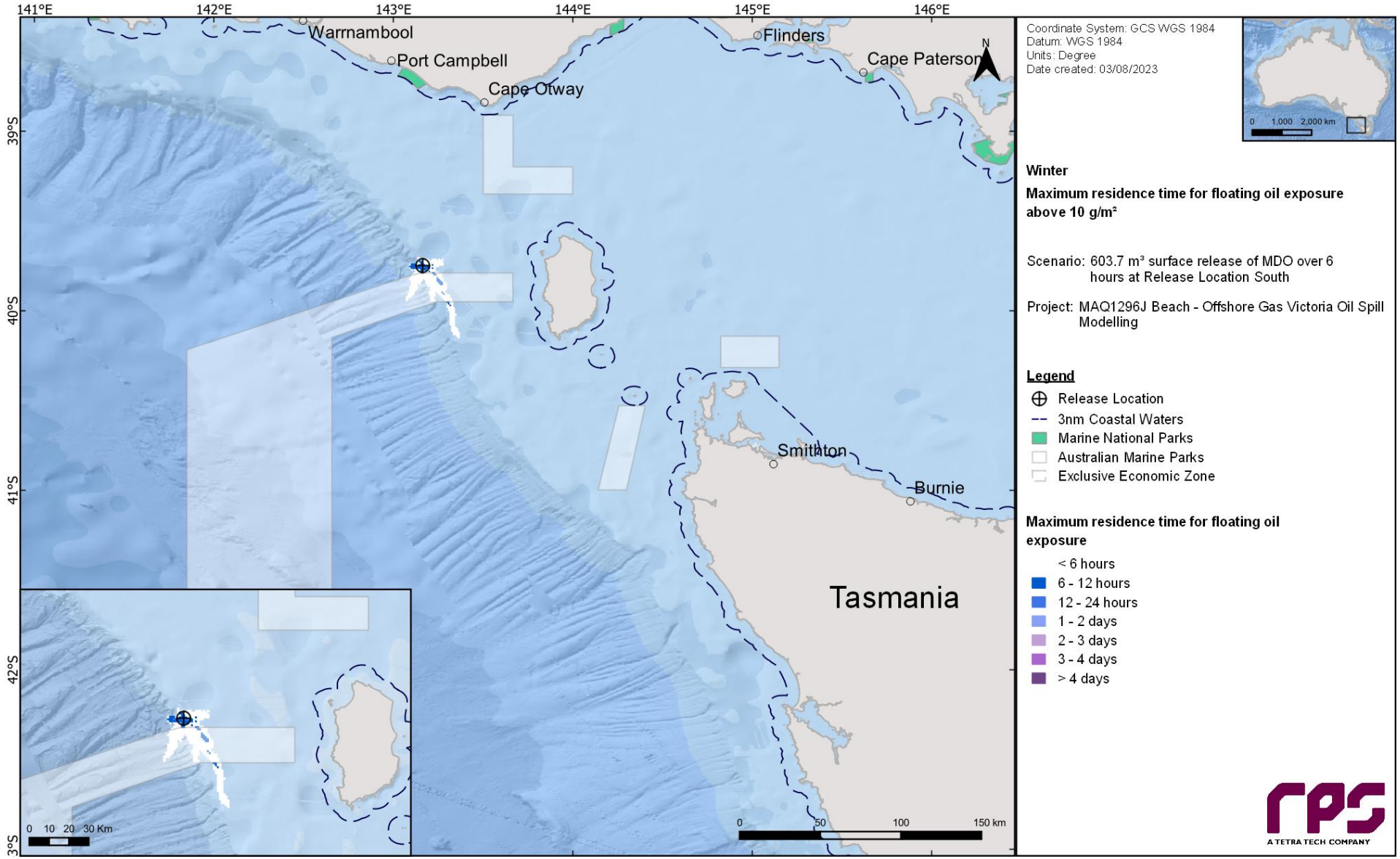

Figure 12-7 Maximum residence time of floating oil exposure above 10 g/m², in the event of 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations during winter conditions.

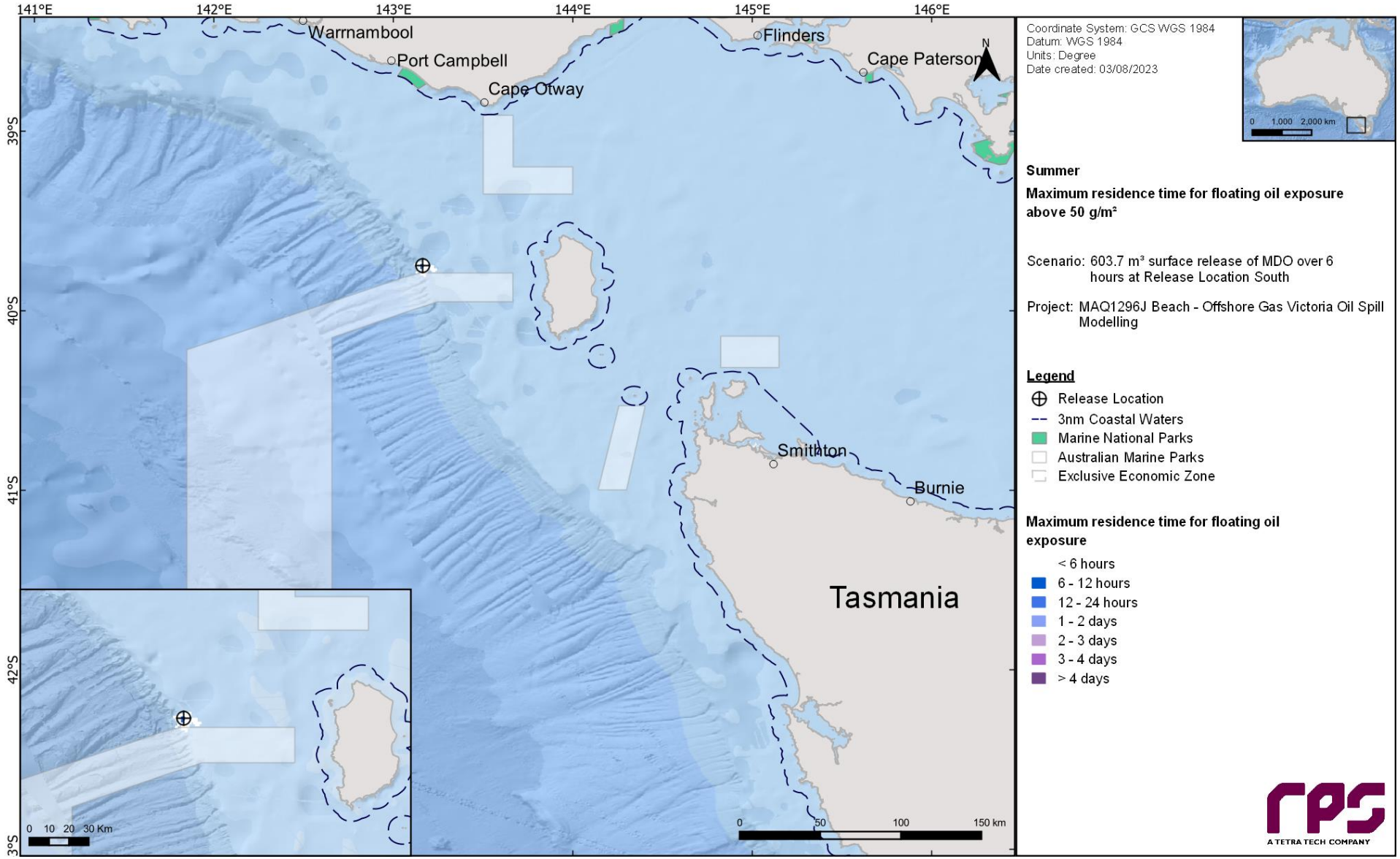

Figure 12-8 Maximum residence time of floating oil exposure above 50 g/m², in the event of 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations during summer conditions.

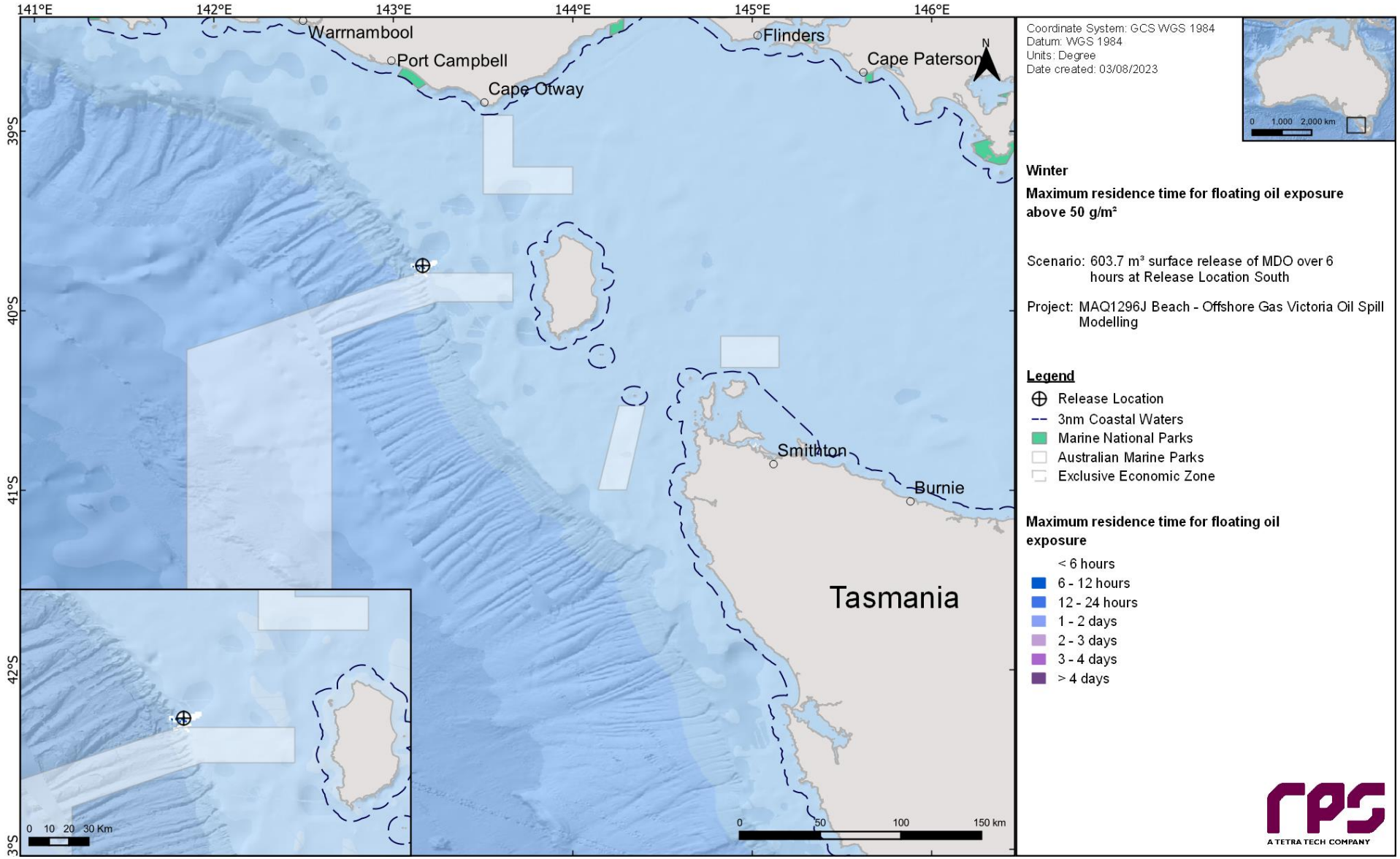

Figure 12-9 Maximum residence time of floating oil exposure above 50 g/m², in the event of 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations during winter conditions.

12.1.3 Shoreline Accumulation

Table 12-4 presents a summary of the predicted potential shoreline accumulation during the summer and winter conditions. The probability of accumulation to any shoreline at, or above, the low level (10 g/m^2) threshold was 7% during summer conditions and 47% during winter conditions. The minimum time before oil accumulation at, or above, the low threshold was 8 days during summer conditions, and 4 days during winter conditions. The maximum volume ashore for a single spill trajectory during the summer and winter conditions was 5 m^3 and 29 m^3, respectively, whilst the maximum length of shoreline accumulation at the low threshold was 13 km and 35 km, respectively. Only during winter shoreline accumulation was predicted for the moderate threshold (100 g/m^2), with a maximum length of shoreline predicted for 6 km. No shoreline accumulation at the high threshold (1,000 g/m^2) was predicted.

Table 12-5 summarises the shoreline accumulation on individual receptors during the summer and winter conditions. King Island recorded the highest probability of shoreline accumulation at the low threshold with 7% (summer) and 43% (winter) and the largest shoreline accumulation with 4 m^3 and 29 m^3, respectively.

The minimum time before shoreline accumulation above the low threshold was 8 days predicted for King Island during summer conditions and 4 days during the winter conditions.

The summer and winter conditions maximum potential shoreline loading above the low, moderate and high shoreline thresholds are presented in Figure 12-10 and Figure 12-11, respectively.

Table 12-4 Summary of oil accumulation across all shorelines. Results are based on a 603.7 m^3 surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations per season.

Shoreline Statistics	Summer	Winter
Probability of accumulation on any shoreline (%)	7	47
Absolute minimum time for visible oil to shore (days)	8	4
Maximum total volume of hydrocarbons ashore (m^3)	5	29
Average volume of hydrocarbons ashore (m^3)	1	4
Maximum length of the shoreline at **10 g/m^2** (km)	13	35
Average shoreline length (km) at **10 g/m^2** (km)	4	10
Maximum length of the shoreline at **100 g/m^2** (km)	-	6
Average shoreline length (km) at **100 g/m^2** (km)	-	3
Maximum length of the shoreline at **1,000 g/m^2** (km)	-	-
Average shoreline length (km) at **1,000 g/m^2** (km)	-	-

Table 12-5 Summary of oil accumulation on individual shoreline receptors. Results are based on a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations per season.

Shoreline Receptor	Summer																			Winter													
	Maximum probability of shoreline loading (%)			Minimum time before shoreline accumulation (days)			Load on shoreline (g/m²)		Volume on shoreline (m³)		Mean length of shoreline accumulation (km)			Maximum length of shoreline accumulation (km)			Maximum probability of shoreline loading (%)			Minimum time before shoreline accumulation (days)			Load on shoreline (g/m²)		Volume on shoreline (m³)		Mean length of shoreline accumulation (km)			Maximum length of shoreline accumulation (km)		
	Low	Mod	High	Low	Mod	High	Mean	Peak	Mean	Peak	Low	Mod	High	Low	Mod	High	Low	Mod	High	Low	Mod	High	Mean	Peak	Mean	Peak	Low	Mod	High	Low	Mod	High
Black Pyramid	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	8	-	-	2	16	< 1	< 1	1	-	-	1	-	-
King Island	7	-	-	8	-	-	2	52	1	4	4	-	-	12	-	-	43	13	-	4	7	-	5	431	4	29	10	3	-	32	6	-
Maatsuyker Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	28	-	-	3	20	< 1	1	2	-	-	2	-	-
Reid Rock	1	-	-	26	-	-	2	13	< 1	< 1	1	-	-	1	-	-	1	-	-	8	-	-	2	11	< 1	< 1	1	-	-	1	-	-
West Coast	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	20	-	-	2	29	1	4	4	-	-	4	-	-

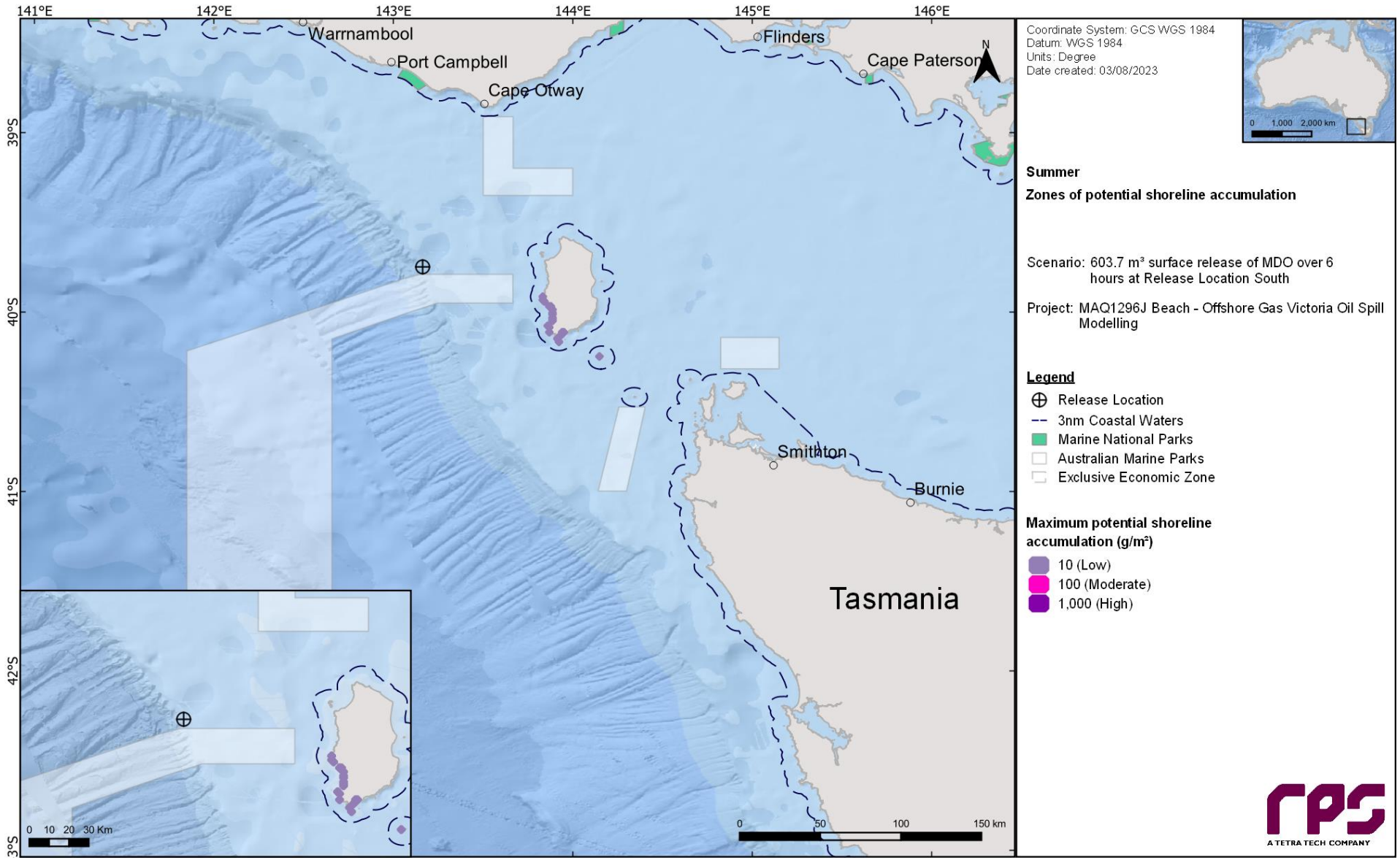

Figure 12-10 Maximum potential shoreline loading in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations during summer conditions.

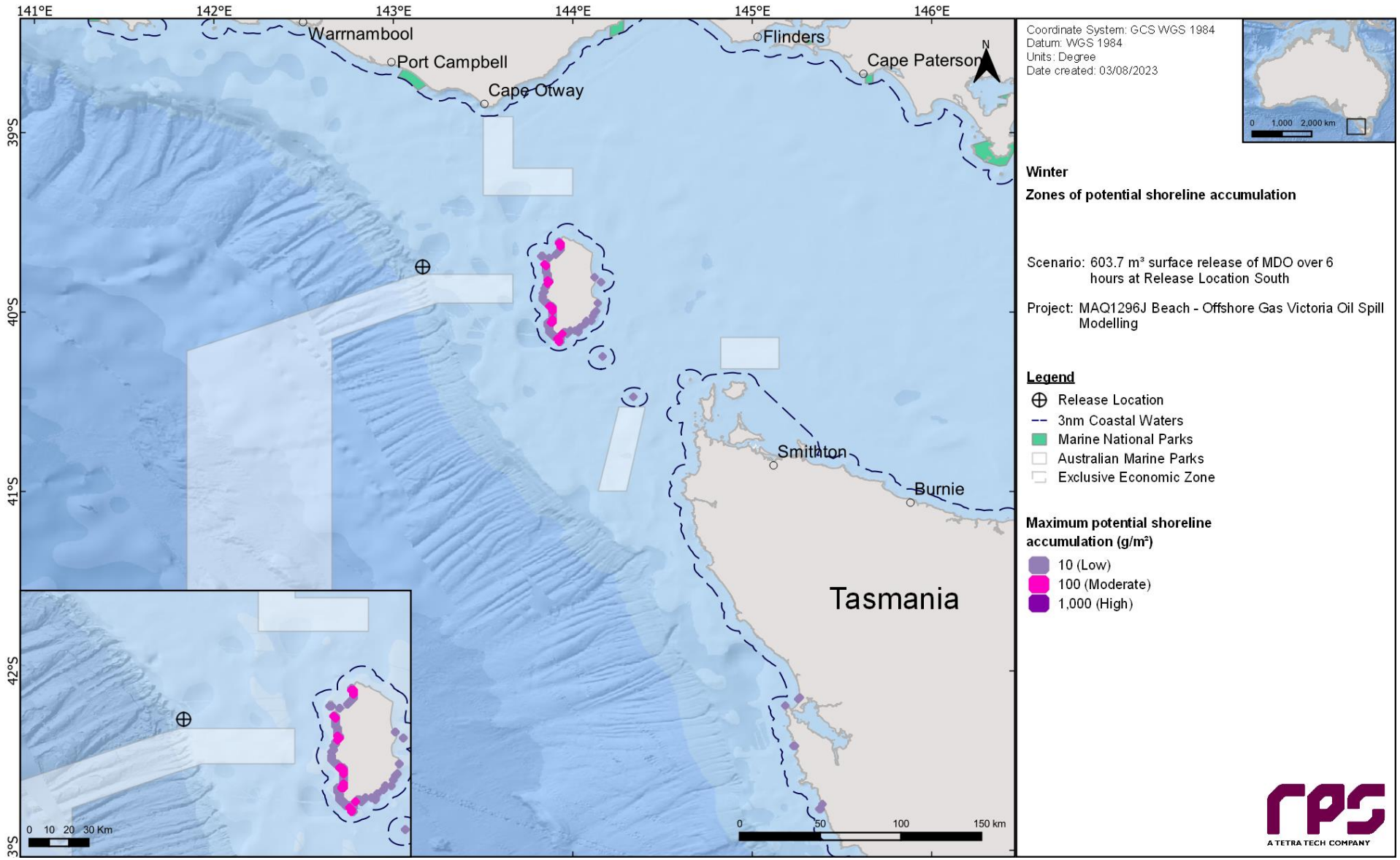

Figure 12-11 Maximum potential shoreline loading in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations during winter conditions.

12.1.4 In-water exposure

12.1.4.1 Dissolved Hydrocarbons

Table 12-6 summarises the probability of exposure to individual receptors from dissolved hydrocarbons in the 0-10 m layer during the summer and winter conditions. No dissolved hydrocarbon exposure at the high (400 ppb) threshold was predicted,

Outside of the receptors that the Release Location South resides within (refer to Table 10-2), the highest concentration of dissolved hydrocarbon was predicted for the Pygmy Blue Whale - Known Foraging Area BIA (summer – 100 ppb, winter – 105 ppb), which also revealed the highest probability of low dissolved hydrocarbon exposure (summer – 39%, winter – 24%).

Table 12-7 presents the predicted minimum time to dissolved hydrocarbon exposure and maximum residence time for dissolved hydrocarbon exposure to individual receptors, in the 0-10 m depth layer, for all seasonal conditions and all thresholds assessed. No receptors revealed residence times above 1 days for the low threshold.

Figure 12-12 and Figure 12-13 present the zones of potential dissolved hydrocarbon exposure for the 0-10 m depth layer, for each threshold assessed under summer and winter conditions, respectively.

Figure 12-14 to Figure 12.17 present the maximum residence time of dissolved hydrocarbon exposure for the NOPSEMA thresholds in summer and winter.

Table 12-6 Probability of dissolved hydrocarbons exposure to marine based receptors in the 0–10 m dept. Results are based on a 603.7 m^3 surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March)				Winter (April to October)			
		Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure			Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure		
			Low	Moderate	High		Low	Moderate	High
AMP	Zeehan	70	21	2	-	100	21	2	-
BIA	Antipodean Albatross - Foraging*	187	75	30	-	178	74	37	-
	Australasian Gannet - Foraging	7	-	-	-	11	1	-	-
	Black-browed Albatross - Foraging*	187	75	30	-	178	74	37	-
	Bullers Albatross - Foraging*	187	75	30	-	178	74	37	-
	Campbell Albatross – Foraging*	187	75	30	-	178	74	37	-
	Common Diving-petrel – Foraging*	187	75	30	-	178	74	37	-
	Indian Yellow-nosed Albatross – Foraging*	187	75	30	-	178	74	37	-
	Pygmy Blue Whale – Distribution*	187	75	30	-	178	74	37	-
	Pygmy Blue Whale – Foraging*	187	75	30	-	178	74	37	-
	Pygmy Blue Whale - Foraging (annual high use area)*	187	75	30	-	178	74	37	-
	Pygmy Blue Whale - Known Foraging Area	100	39	5	-	105	24	6	-
	Short-tailed Shearwater – Foraging*	187	75	30	-	178	74	37	-
	Shy Albatross – Foraging*	187	75	30	-	178	74	37	-
	Southern Right Whale - Known Core Range*	187	75	30	-	178	74	37	-
	Wandering Albatross – Foraging*	187	75	30	-	178	74	37	-
	Wedge-tailed Shearwater – Foraging*	187	75	30	-	178	74	37	-
	White Shark – Distribution*	187	75	30	-	178	74	37	-
	White-faced Storm-petrel - Foraging	43	2	-	-	38	4	-	-
EEZ	Australian*	187	75	30	-	178	74	37	-
IMCRA	Otway*	187	75	30	-	178	74	37	-
KEF	West Tasmania Canyons	69	13	1	-	71	11	1	-
State Waters	Tasmania	3	-	-	-	12	1	-	-

*The release location resides within the receptor boundaries.

Table 12-7 Predicted minimum time to dissolved hydrocarbon exposure and maximum residence time for dissolved hydrocarbon exposure to individual receptors in the 0-10 m depth layer. Results are based on a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill trajectories per season.

Receptor		Summer (November through to March)						Winter (April to October)					
		Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)			Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
AMP	Zeehan	< 1	< 1	-	1	< 1	-	< 1	< 1	-	< 1	< 1	-
BIA	Antipodean Albatross - Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Australasian Gannet - Foraging	-	-	-	-	-	-	5	-	-	< 1	-	-
	Black-browed Albatross - Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Bullers Albatross - Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Campbell Albatross – Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Common Diving-petrel – Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Indian Yellow-nosed Albatross – Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Pygmy Blue Whale – Distribution*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Pygmy Blue Whale – Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Pygmy Blue Whale - Foraging (annual high use area)*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Pygmy Blue Whale - Known Foraging Area	< 1	< 1	-	1	< 1	-	< 1	< 1	-	< 1	< 1	-
	Short-tailed Shearwater – Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Shy Albatross – Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Southern Right Whale - Known Core Range*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Wandering Albatross – Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Wedge-tailed Shearwater – Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	White Shark – Distribution*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	White-faced Storm-petrel - Foraging	3	-	-	< 1	-	-	1	2	-	< 1	-	-
EEZ	Australian*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
IMCRA	Otway*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
KEF	West Tasmania Canyons	< 1	1	-	< 1	< 1	-	< 1	1	-	< 1	< 1	-
State Waters	Tasmania	-	-	-	-	-	-	4	-	-	< 1	-	-

*The release location resides within the receptor boundaries.

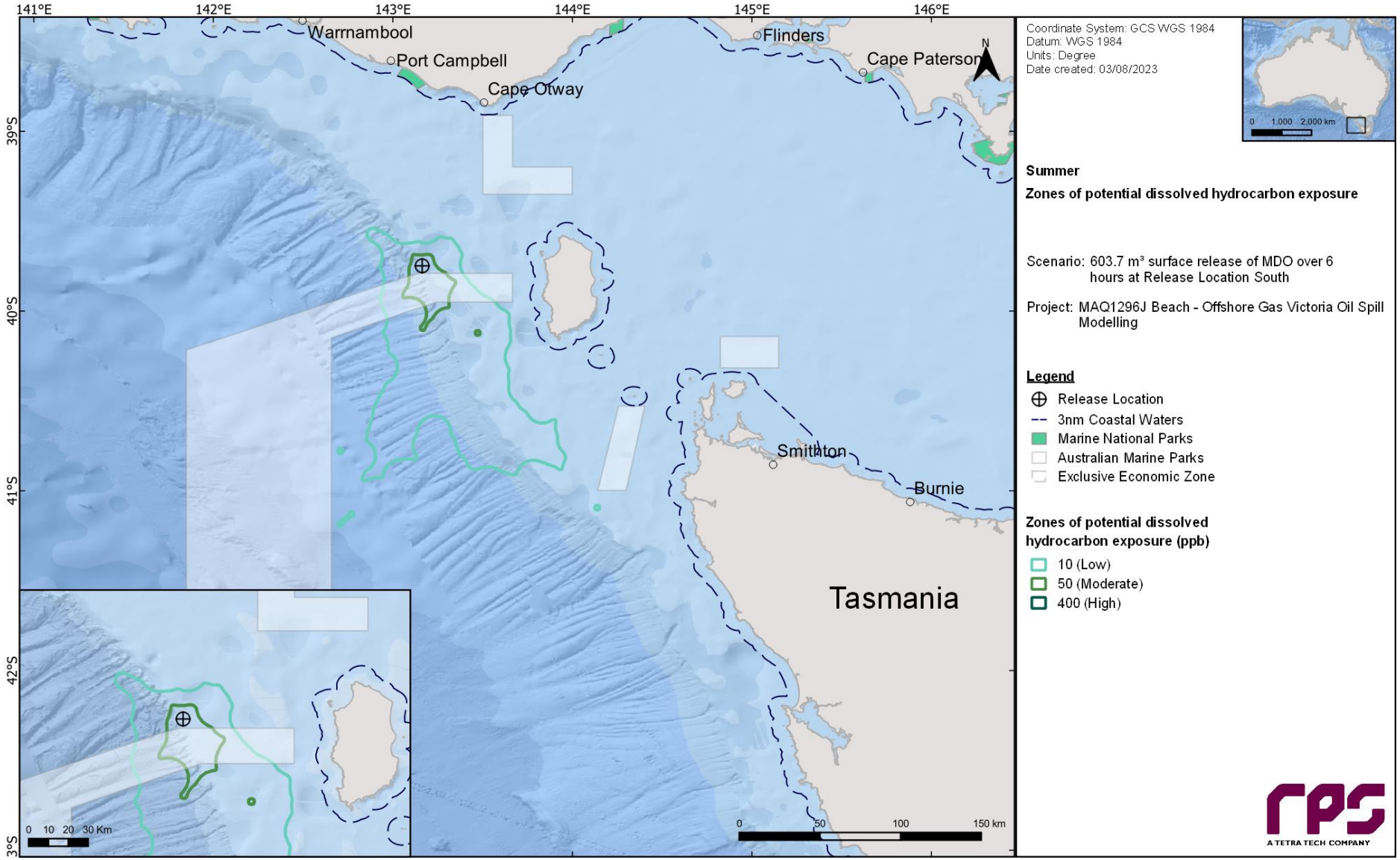

Figure 12-12 Zones of potential dissolved hydrocarbon exposure at 0-10 m below the sea in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations during summer conditions.

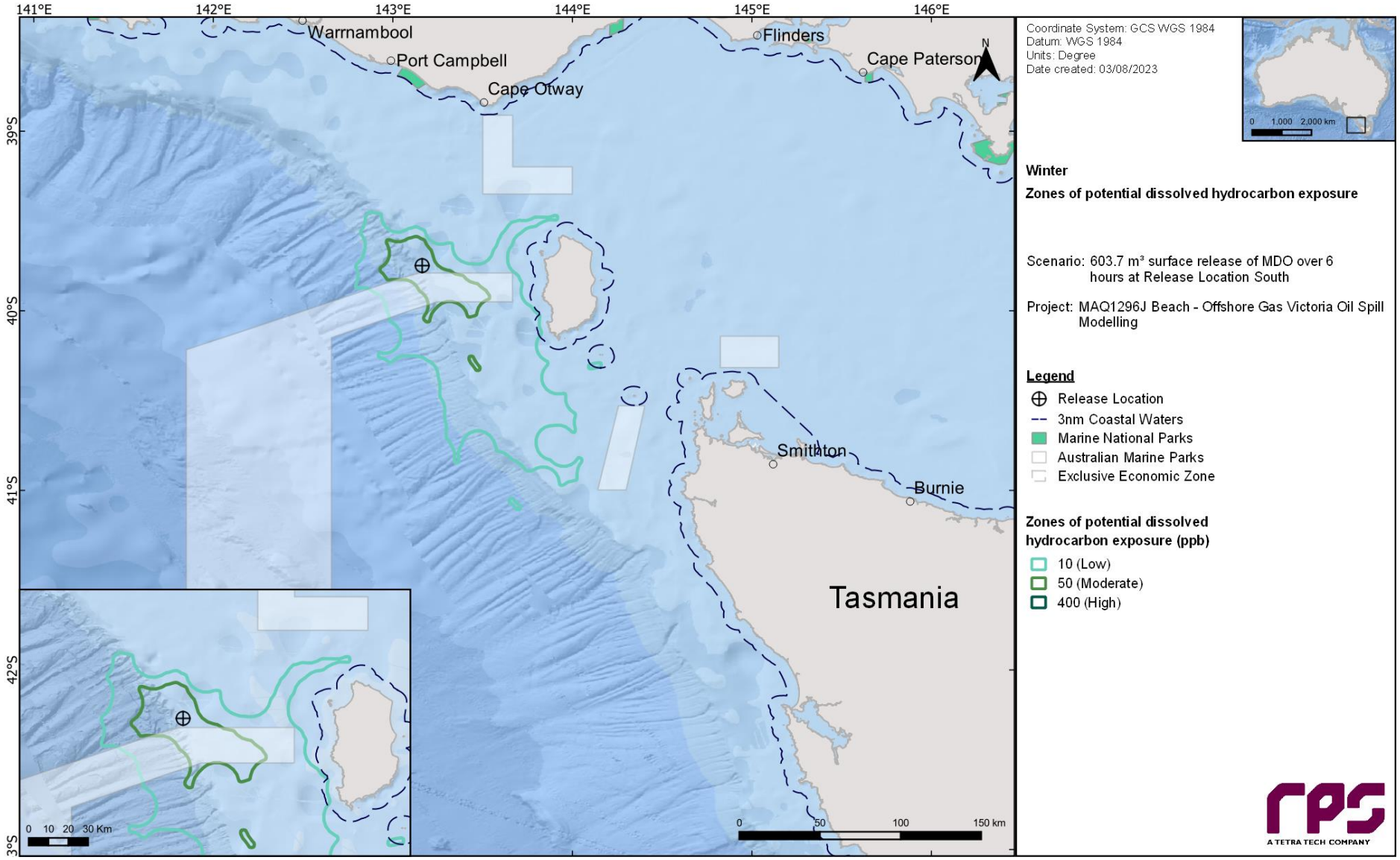

Figure 12-13 Zones of potential dissolved hydrocarbon exposure at 0-10 m below the sea in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations during winter conditions.

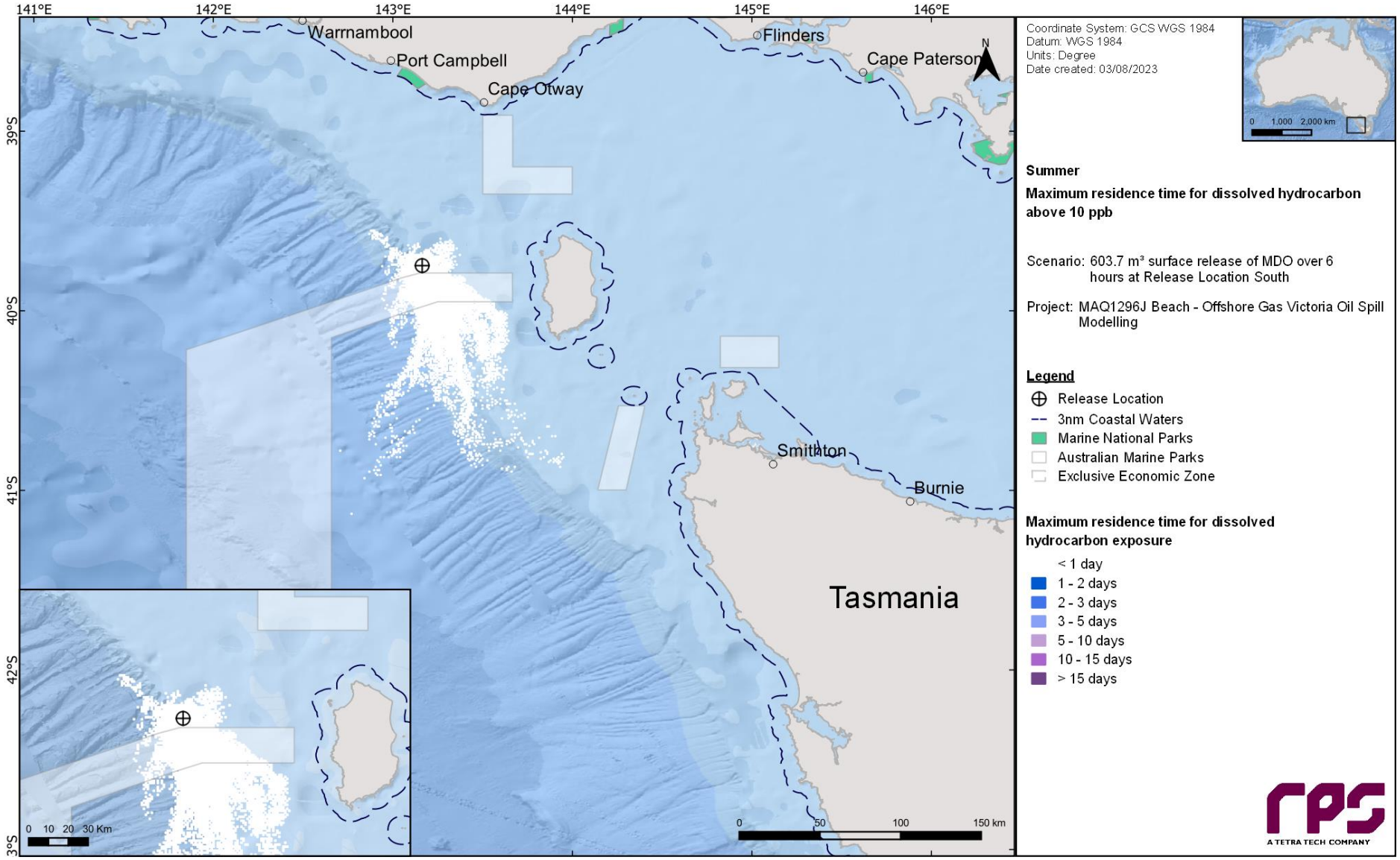

Figure 12-14 Maximum residence time for dissolved hydrocarbon exposure above 10 ppb, at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations during summer conditions.

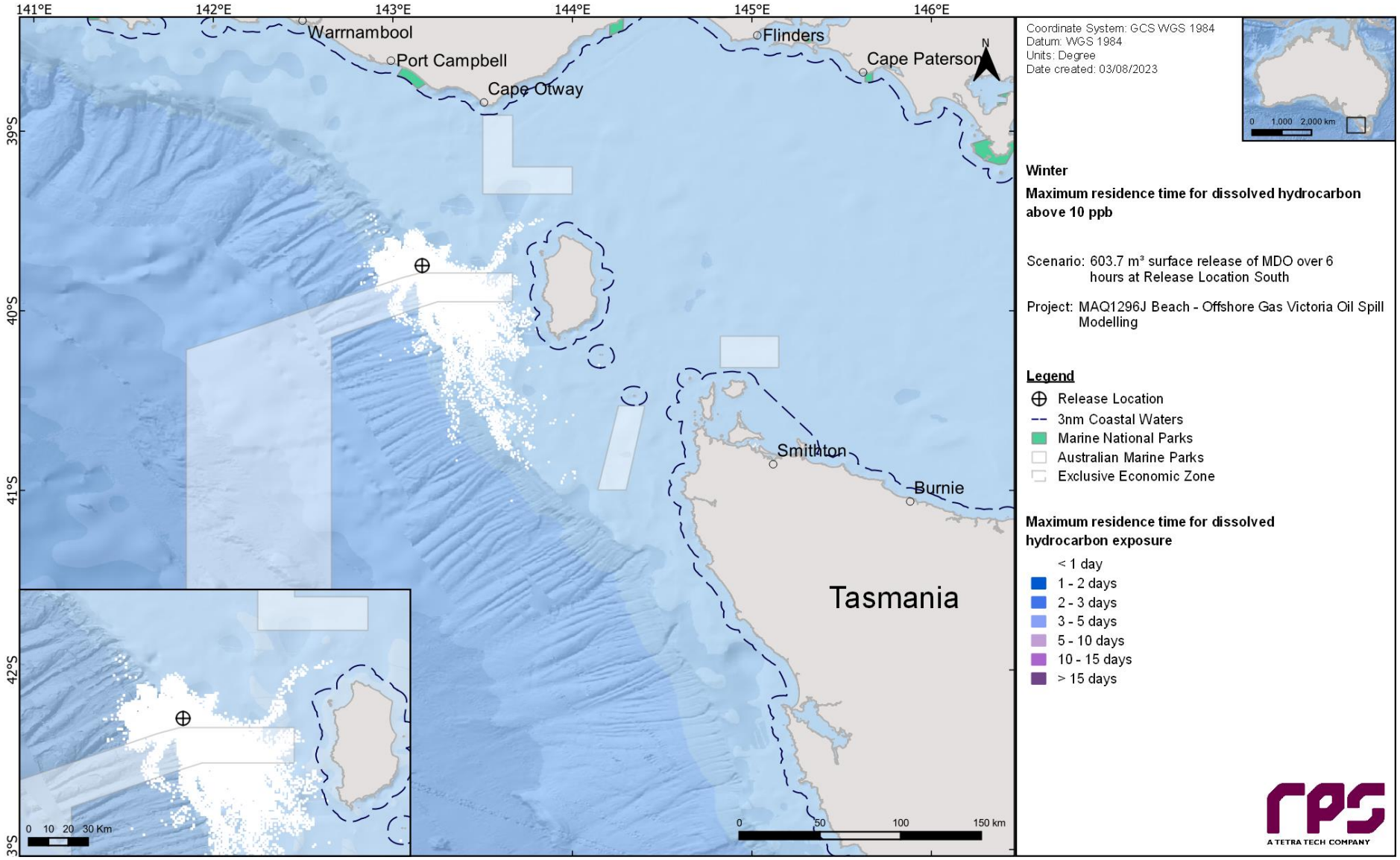

Figure 12.15 Maximum residence time for dissolved hydrocarbon exposure above 10 ppb, at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations during winter conditions.

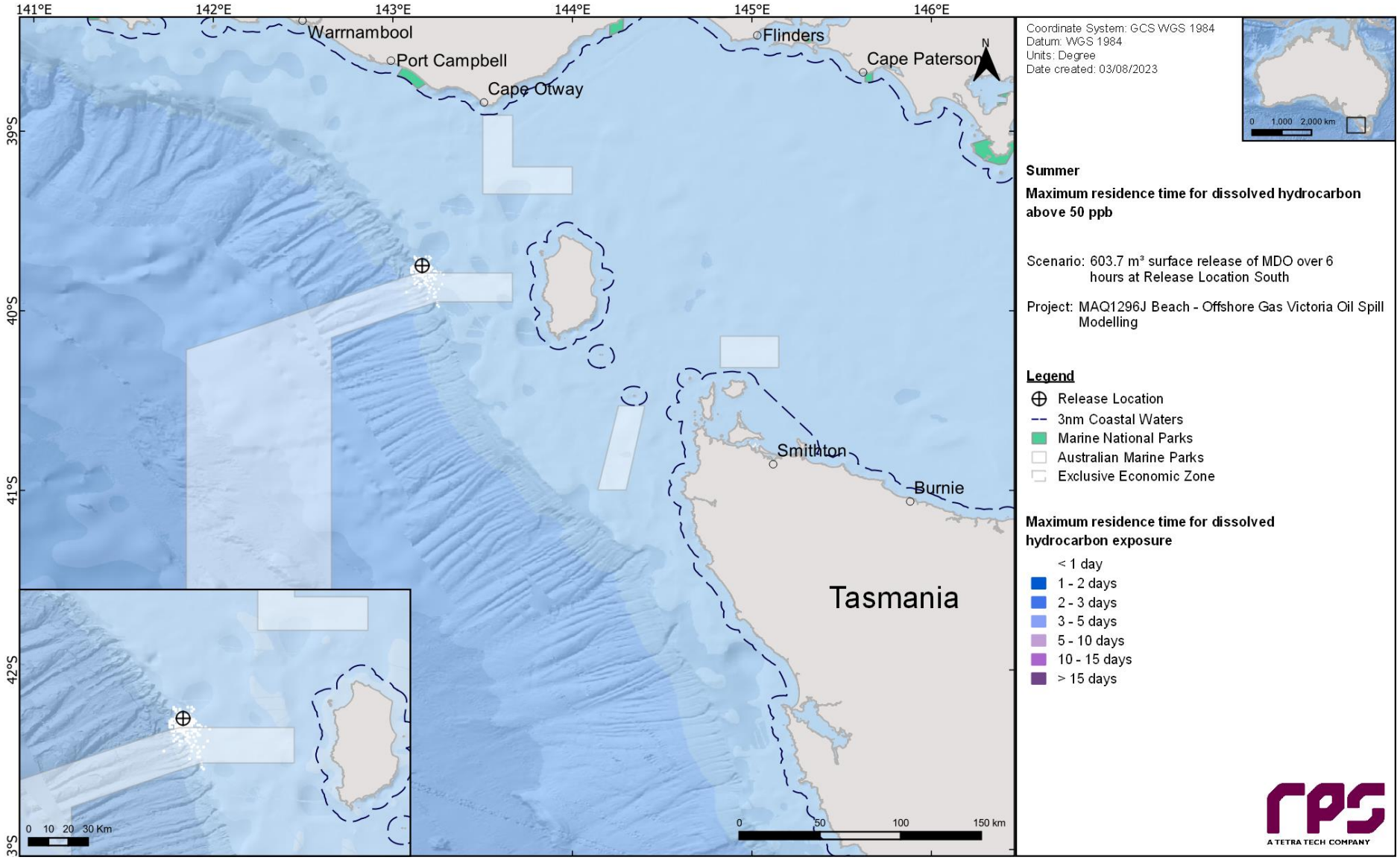

Figure 12.16 Maximum residence time for dissolved hydrocarbon exposure above 50 ppb, at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations during summer conditions.

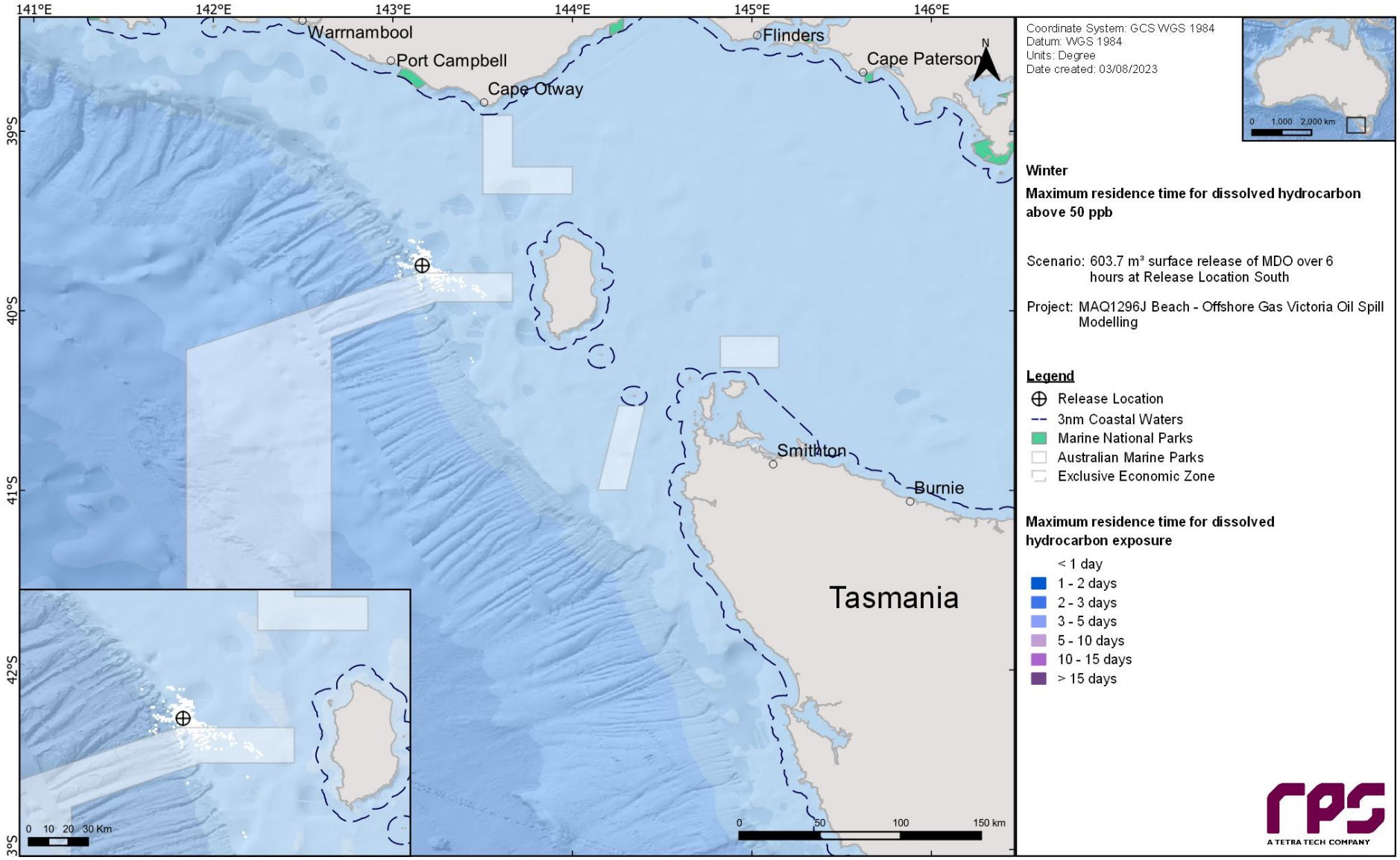

Figure 12.17 Maximum residence time for dissolved hydrocarbon exposure above 50 ppb, at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations during winter conditions.

12.1.4.2 Entrained Hydrocarbons

Table 12-8 presents the probability of exposure to individual receptors from entrained hydrocarbons in the 0-10 m depth layer for the summer and winter conditions.

Outside of the receptors that the Release Location South resides within (refer to Table 10-2), the highest concentration of entrained hydrocarbon was predicted for Pygmy Blue Whale - Known Foraging Area BIA (summer – 4,867 ppb, winter – 5,489 ppb). The same receptor recorded the highest probability of low entrained hydrocarbon exposure (90% summer and 85% winter).

Table 12-9 presents the predicted minimum time to entrained hydrocarbon exposure and maximum residence time for entrained hydrocarbon exposure to individual receptors in the 0-10 m depth layer, for all seasonal conditions and all thresholds assessed.

Figure 12-18 and Figure 12-19 present the zones of potential entrained hydrocarbon exposure for the 0-10 m depth layer, for each threshold assessed under summer and winter conditions, respectively.

Figure 12-20 to Figure 12-23 present the maximum residence time of entrained hydrocarbon exposure for the NOPSEMA thresholds in summer and winter.

Table 12-8 Probability of entrained hydrocarbons exposure to marine based receptors in the 0–10 m depth layer. Results are based on a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March)			Winter (April to October)		
		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure	
			Low	High		Low	High
AMP	Apollo	1	-	-	14	1	-
	Franklin	12	1	-	20	4	-
	Zeehan	3,291	86	64	3,366	80	64
BIA	Antipodean Albatross - Foraging*	16,927	95	91	15,779	99	96
	Australasian Gannet - Foraging	29	6	-	39	11	-
	Black-browed Albatross - Foraging*	16,927	95	91	15,779	99	96
	Black-faced Cormorant - Foraging	9	-	-	62	10	-
	Bullers Albatross - Foraging*	16,927	95	91	15,779	99	96
	Campbell Albatross – Foraging*	16,927	95	91	15,779	99	96
	Common Diving-petrel – Foraging*	16,927	95	91	15,779	99	96
	Indian Yellow-nosed Albatross – Foraging*	16,927	95	91	15,779	99	96
	Little Penguin - Foraging	7	-	-	51	9	-
	Pygmy Blue Whale – Distribution*	16,927	95	91	15,779	99	96
	Pygmy Blue Whale – Foraging*	16,927	95	91	15,779	99	96
	Pygmy Blue Whale - Foraging (annual high use area)*	16,927	95	91	15,779	99	96
	Pygmy Blue Whale - Known Foraging Area	4,867	90	73	5,489	85	67
	Short-tailed Shearwater – Foraging*	16,927	95	91	15,779	99	96
	Shy Albatross – Foraging*	16,927	95	91	15,779	99	96
	Soft-plumaged Petrel - Foraging	14	1	-	23	3	-
	Southern Right Whale - Connecting habitat	20	2	-	101	25	1
	Southern Right Whale - Known Core Range*	16,927	95	91	15,779	99	96
	Wandering Albatross – Foraging*	16,927	95	91	15,779	99	96
	Wedge-tailed Shearwater – Foraging*	16,927	95	91	15,779	99	96
	White Shark – Distribution*	16,927	95	91	15,779	99	96

Receptor		Summer (November through to March)			Winter (April to October)		
		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure	
			Low	High		Low	High
	White Shark - Foraging	36	6	-	114	30	2
	White-faced Storm-petrel - Foraging	147	44	3	398	49	6
EEZ	Australian*	16,927	95	91	15,779	99	96
IBRA	King Island	18	2	-	92	25	-
IMCRA	Central Bass Strait	5	-	-	52	4	-
	Franklin	22	5	-	55	9	-
	Otway*	16,927	95	91	15,779	99	96
KEF	West Tasmania Canyons	2,445	80	54	2,273	59	40
RSB	Bell Reef	14	2	-	23	9	-
SHORE	Black Pyramid	4	-	-	17	3	-
	King Island	18	2	-	86	25	-
	Reid Rock	13	1	-	29	7	-
State Waters	Tasmania	32	5	-	138	30	2

*The release location resides within the receptor boundaries.

Table 12-9 Predicted minimum time to entrained hydrocarbon exposure and maximum residence time for entrained hydrocarbon exposure to individual receptors in the 0-10 m depth layer. Results are based on a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill trajectories per season.

Receptor		Summer (November through to March)				Winter (April to October)			
		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)	
		Low	High	Low	High	Low	High	Low	High
AMP	Apollo	-	-	-	-	6	-	< 1	-
	Franklin	10	-	< 1	-	6	-	1	-
	Zeehan	< 1	< 1	8	2	< 1	< 1	9	2
BIA	Antipodean Albatross - Foraging*	< 1	< 1	9	3	< 1	< 1	9	3
	Australasian Gannet - Foraging	5	-	2	-	5	-	3	-
	Black-browed Albatross - Foraging*	< 1	< 1	9	3	< 1	< 1	9	3
	Black-faced Cormorant - Foraging	-	-	-	-	2	-	14	-
	Bullers Albatross - Foraging*	< 1	< 1	9	3	< 1	< 1	9	3
	Campbell Albatross – Foraging*	< 1	< 1	9	3	< 1	< 1	9	3
	Common Diving-petrel – Foraging*	< 1	< 1	9	3	< 1	< 1	14	3
	Indian Yellow-nosed Albatross – Foraging*	< 1	< 1	9	3	< 1	< 1	9	3
	Little Penguin - Foraging	-	-	-	-	3	-	12	-
	Pygmy Blue Whale – Distribution*	< 1	< 1	9	3	< 1	< 1	14	3
	Pygmy Blue Whale – Foraging*	< 1	< 1	9	3	< 1	< 1	14	3
	Pygmy Blue Whale - Foraging (annual high use area)*	< 1	< 1	9	3	< 1	< 1	10	3
	Pygmy Blue Whale - Known Foraging Area	< 1	< 1	8	3	< 1	< 1	14	3
	Short-tailed Shearwater – Foraging*	< 1	< 1	9	3	< 1	< 1	14	3
	Shy Albatross – Foraging*	< 1	< 1	9	3	< 1	< 1	14	3
	Soft-plumaged Petrel - Foraging	13	-	< 1	-	9	-	1	-
	Southern Right Whale - Connecting habitat	4	-	2	-	3	4	14	< 1
	Southern Right Whale - Known Core Range*	< 1	< 1	9	3	< 1	< 1	14	3
	Wandering Albatross – Foraging*	< 1	< 1	9	3	< 1	< 1	9	3
	Wedge-tailed Shearwater – Foraging*	< 1	< 1	9	3	< 1	< 1	14	3
	White Shark – Distribution*	< 1	< 1	9	3	< 1	< 1	9	3

Receptor		Summer (November through to March)				Winter (April to October)			
		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)	
		Low	High	Low	High	Low	High	Low	High
	White Shark - Foraging	4	-	2	-	3	4	6	< 1
	White-faced Storm-petrel - Foraging	2	2	5	< 1	1	1	14	1
EEZ	Australian*	< 1	< 1	9	3	< 1	< 1	14	3
IBRA	King Island	6	-	1	-	3	-	14	-
IMCRA	Central Bass Strait	-	-	-	-	3	-	2	-
	Franklin	9	-	2	-	6	-	1	-
	Otway*	< 1	< 1	9	3	< 1	< 1	14	3
KEF	West Tasmania Canyons	< 1	< 1	8	2	< 1	< 1	8	2
RSB	Bell Reef	< 1	< 1	< 1	-	5	-	1	-
SHORE	Black Pyramid	-	-	-	-	7	-	< 1	-
	King Island	6	-	1	-	3	-	14	-
	Reid Rock	7	-	< 1	-	6	-	2	-
State Waters	Tasmania	3	-	2	-	3	3	14	< 1

*The release location resides within the receptor boundaries.

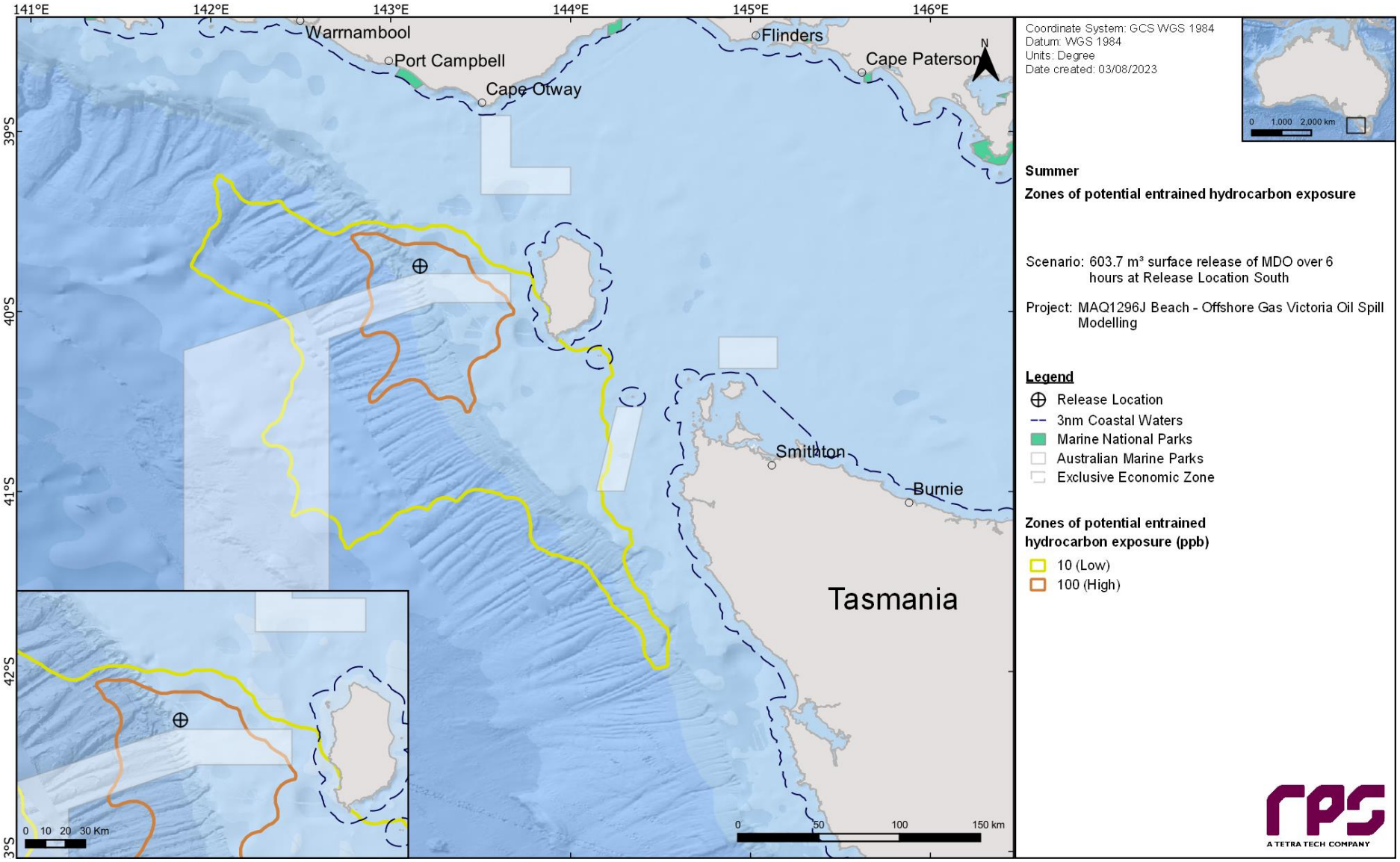

Figure 12-18 Zones of potential entrained hydrocarbon exposure at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations during summer conditions.

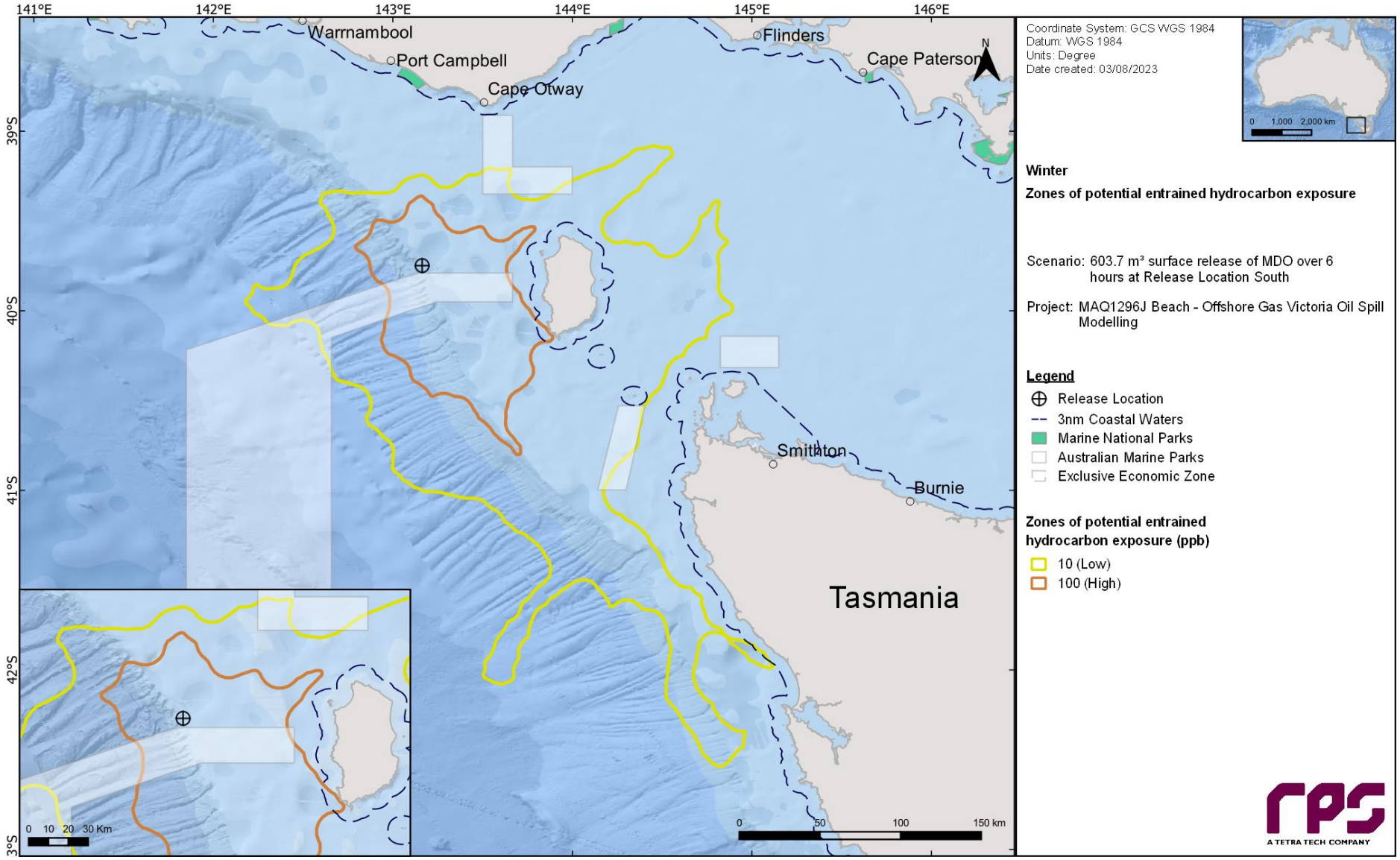

Figure 12-19 Zones of potential entrained hydrocarbon exposure at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations during winter conditions.

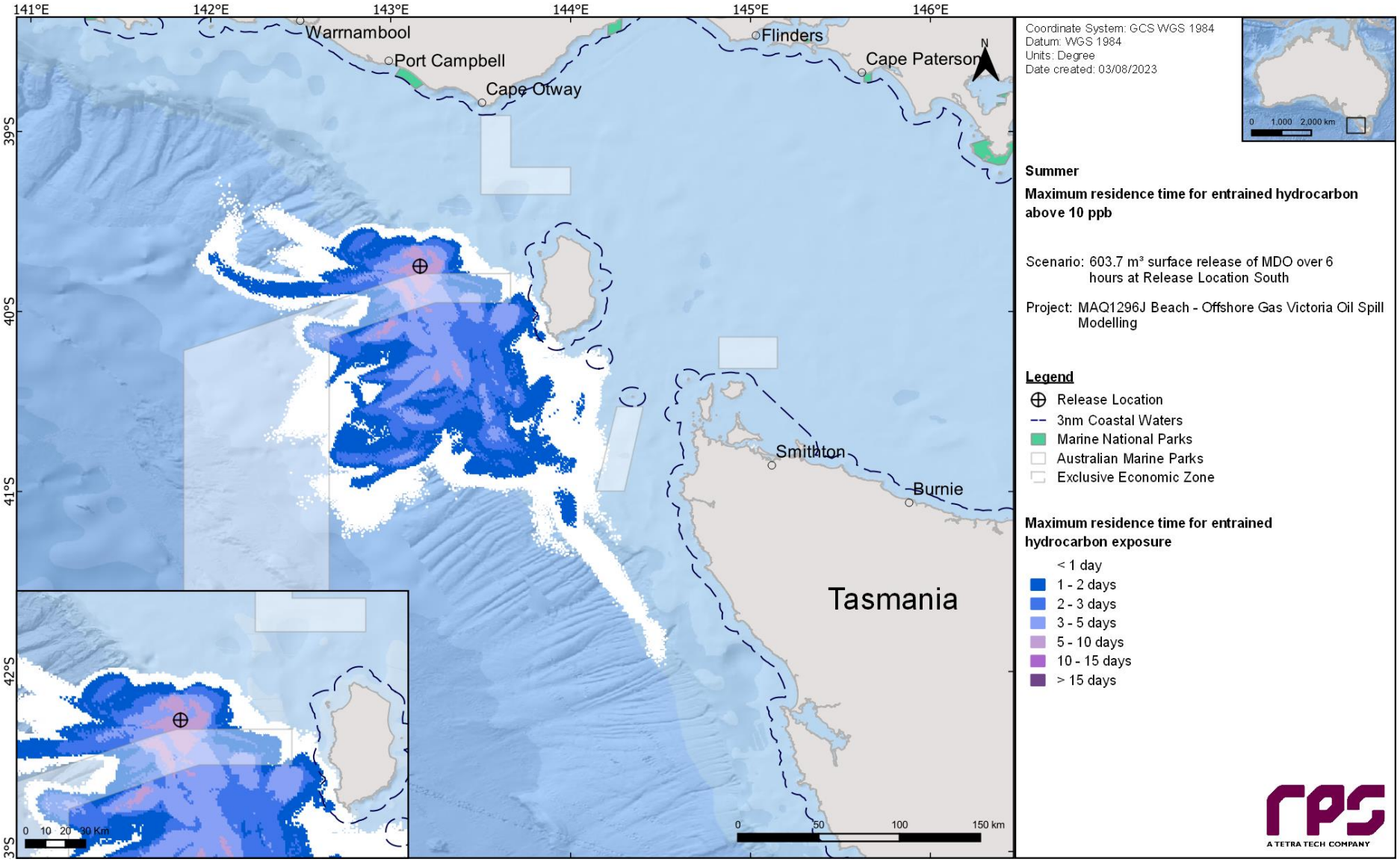

Figure 12-20 Maximum residence time for entrained hydrocarbon exposure above 10 ppb, at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations during summer conditions.

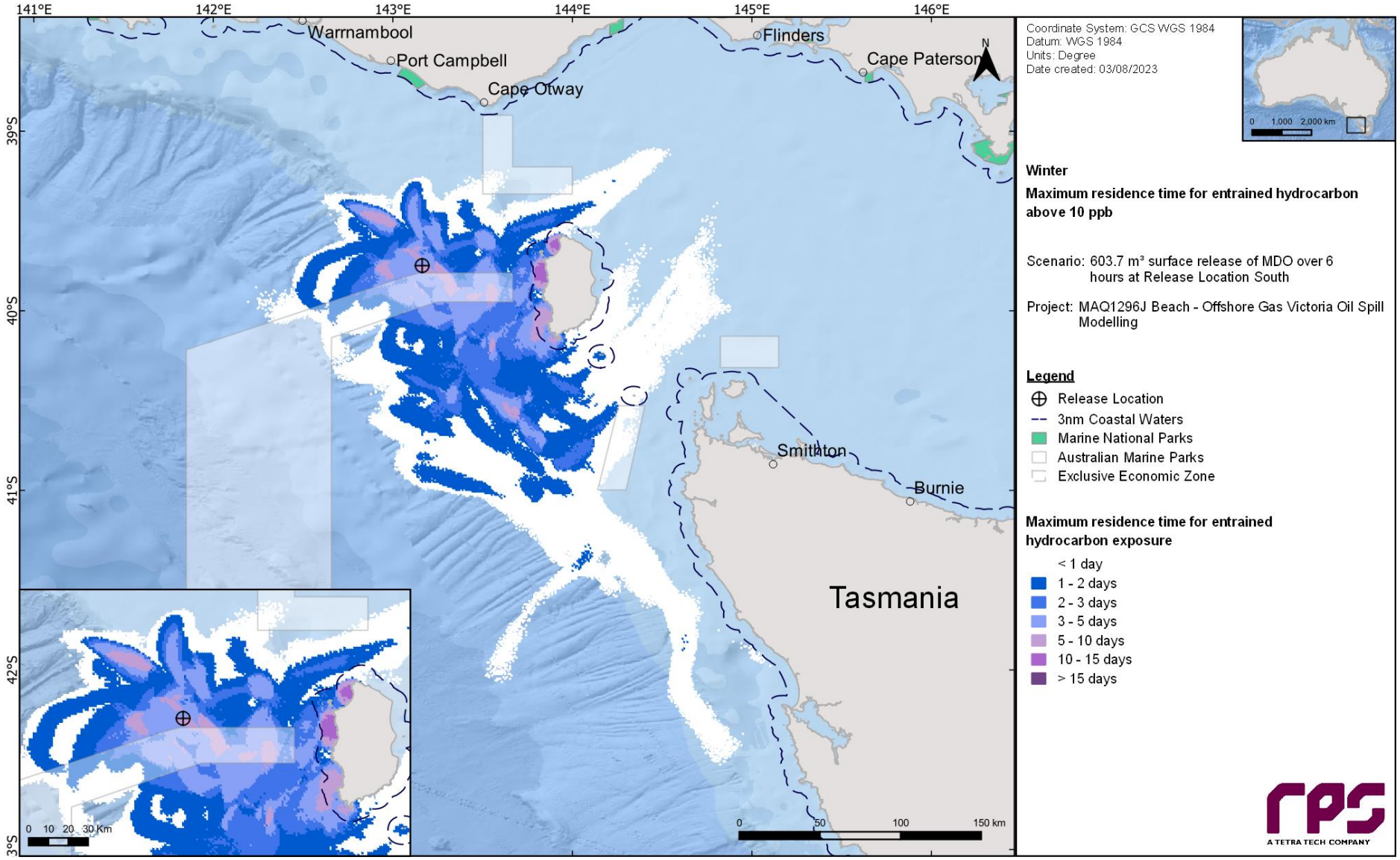

Figure 12-21 Maximum residence time for entrained hydrocarbon exposure above 10 ppb, at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations during winter conditions.

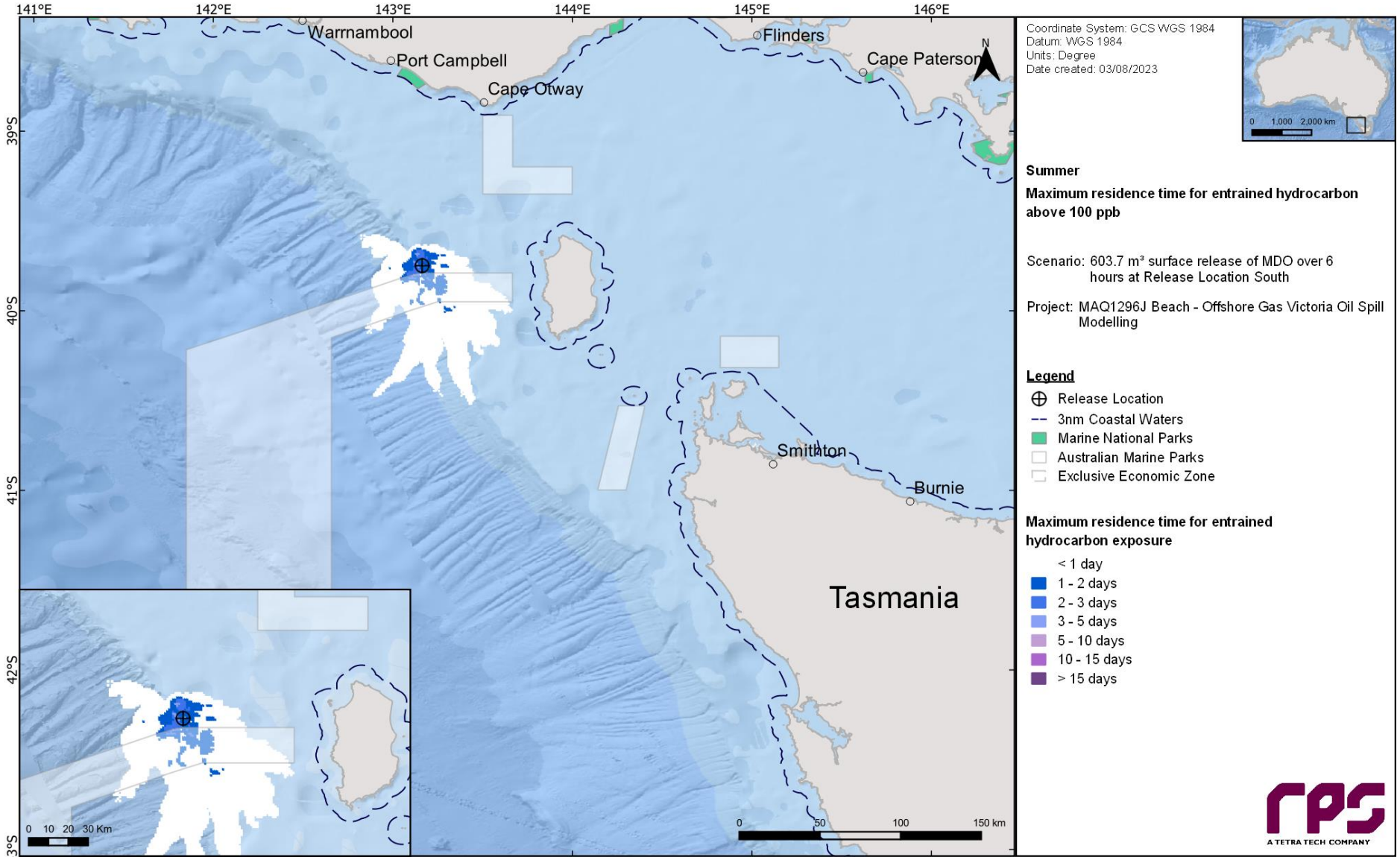

Figure 12-22 Maximum residence time for entrained hydrocarbon exposure above 100 ppb, at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations during summer conditions.

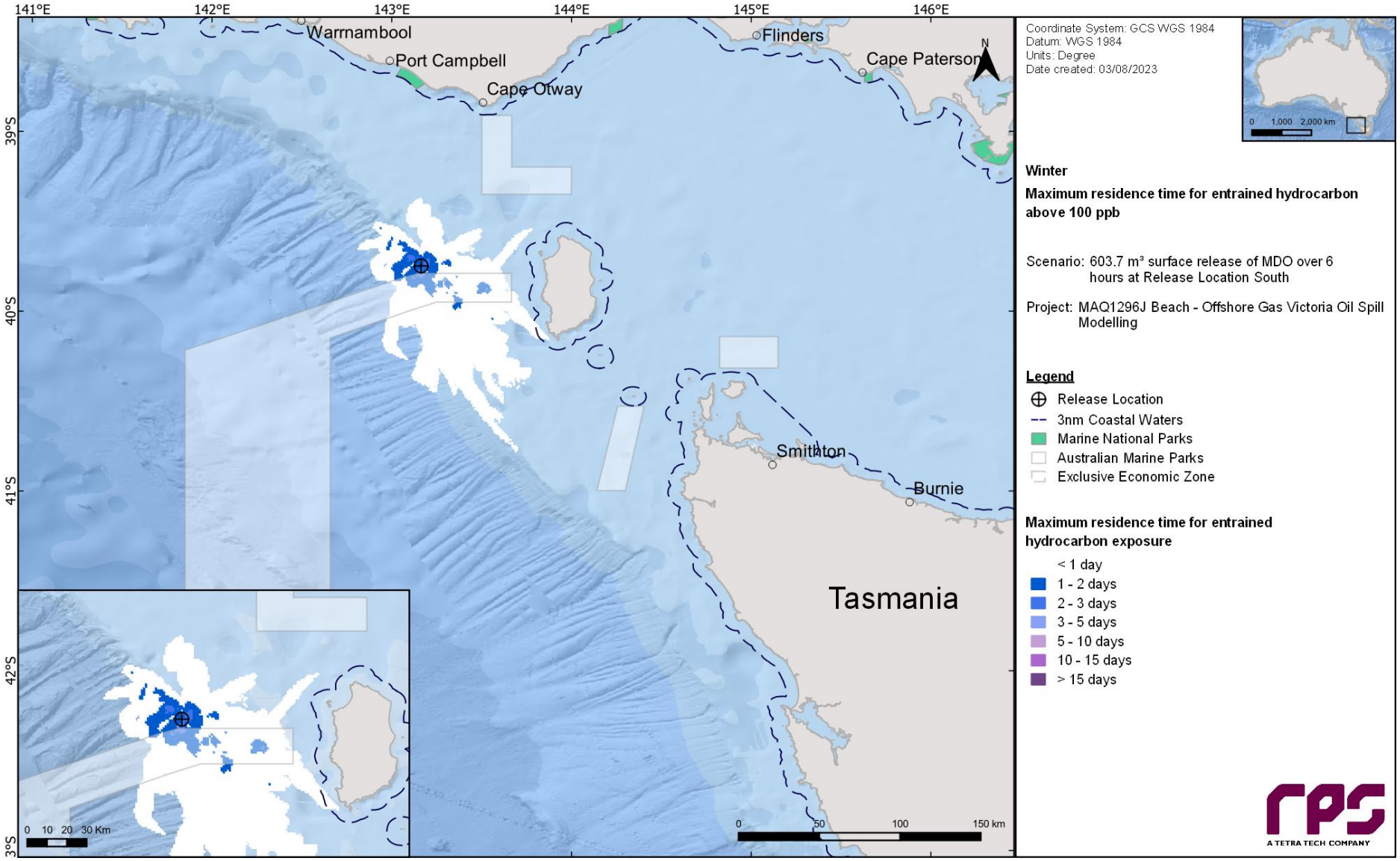

Figure 12-23 Maximum residence time for entrained hydrocarbon exposure above 100 ppb, at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Release Location South field. The results were calculated from 100 spill simulations during winter conditions.

13 RESULTS – LOSS OF WELL CONTROL AT RELEASE LOCATION NORTH

This scenario examined a 69,120.0 m^3 subsea release of condensate over 86 days from a loss of well control at the Release Location North. A total of 200 spill simulations were run (i.e., 100 spills per season) and tracked for 100 days. The results for all 100 simulations per season were combined and are presented on a seasonal basis (i.e., summer and winter).

13.1 Stochastic Analysis

13.1.1 Area of Exposure

Figure 13-1 presents the combined area of potential exposure for surface, shoreline, entrained and dissolved, by overlaying the results from all 200 simulations (i.e., 100 per season) during summer and winter conditions.

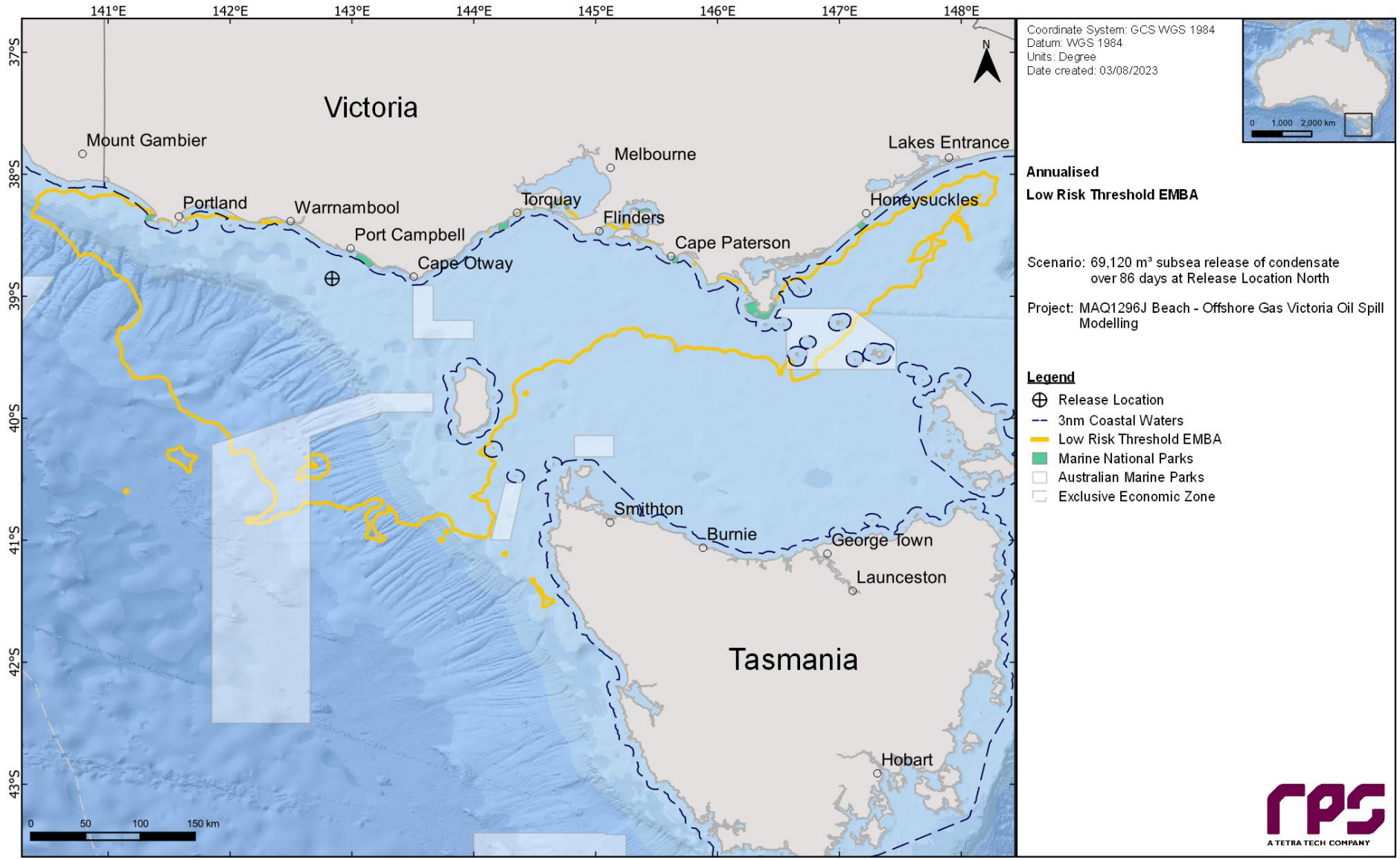

Figure 13-1 Predicted area of exposure for low thresholds produced by overlaying the results from all 200 simulations, resulting from a 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location Northduring summer and winter conditions.

13.1.2 Floating Oil Exposure

Table 13-1 summarises the maximum distance travelled by floating oil on the sea surface at each threshold. The maximum distance from the release location to the low (1–10 g/m^2) and moderate (10–50 g/m^2) exposure zones was 53 km (east) during summer conditions and 12 km (south-southeast) during winter conditions, respectively. For the high threshold (> 50 g/m^2), the maximum distance from the release location was 1 km southeast (summer) and northwest (winter).

Table 13-2 summarises the potential floating oil exposure to individual receptors during the summer and winter conditions. Outside of the receptors that the Release Location North resides within (refer to Table 10-3), floating oil exposure above the low threshold was predicted at the Pygmy Blue Whale – Foraging(10% summer, 3% winter) and Short-tailed Shearwater – Foraging (19% summer, 13% winter) BIAs.

Table 13-3 presents the maximum residence time of floating oil exposure for each individual grid cell within each individual receptor during summer and winter.

Figure 13-2 and Figure 13-3 present the zones of potential floating oil exposure for all thresholds under summer and winter conditions, respectively.

Figure 13-4 to Figure 13-7 present the maximum residence time of floating oil exposure for the NOPSEMA thresholds during summer and winter, respectively.

Table 13-1 Maximum distance and direction from the release location to the edge of floating oil exposure. Results are based on a 69,120.0 m^3 subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations per season.

Season	Distance and direction travelled	Zones of potential floating oil exposure		
		Low	Moderate	High
Summer	Maximum distance (km) from release location	51	12	1
	Maximum distance (km) from release location (99th percentile)	26	11	1
	Direction	E	SSE	SE
Winter	Maximum distance (km) from release location	53	11	1
	Maximum distance (km) from release location (99th percentile)	26	10	1
	Direction	E	ESE	NW

Table 13-2 Summary of the potential floating oil exposure to individual receptors. Results are based on a 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March)						Winter (April to October)					
		Probability of floating oil exposure (%)			Minimum time before floating oil exposure (days)			Probability of floating oil exposure (%)			Minimum time before floating oil exposure (days)		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
BIA	Antipodean Albatross - Foraging*	100	100	5	< 1	< 1	1	100	100	8	< 1	< 1	1
	Black-browed Albatross - Foraging*	100	100	5	< 1	< 1	1	100	100	8	< 1	< 1	1
	Bullers Albatross - Foraging*	100	100	5	< 1	< 1	1	100	100	8	< 1	< 1	1
	Campbell Albatross – Foraging*	100	100	5	< 1	< 1	1	100	100	8	< 1	< 1	1
	Common Diving-petrel – Foraging*	100	100	5	< 1	< 1	1	100	100	8	< 1	< 1	1
	Indian Yellow-nosed Albatross – Foraging*	100	100	5	< 1	< 1	1	100	100	8	< 1	< 1	1
	Pygmy Blue Whale – Distribution*	100	100	5	< 1	< 1	1	100	100	8	< 1	< 1	1
	Pygmy Blue Whale - Foraging	10	-	-	6	-	-	3	-	-	10	-	-
	Pygmy Blue Whale - Foraging (annual high use area)*	100	100	5	< 1	< 1	1	100	100	8	< 1	< 1	1
	Short-tailed Shearwater - Foraging	19	-	-	2	-	-	13	-	-	2	-	-
	Shy Albatross – Foraging*	100	100	5	< 1	< 1	1	100	100	8	< 1	< 1	1
	Southern Right Whale - Known Core Range*	100	100	5	< 1	< 1	1	100	100	8	< 1	< 1	1
	Wandering Albatross – Foraging*	100	100	5	< 1	< 1	1	100	100	8	< 1	< 1	1
	Wedge-tailed Shearwater – Foraging*	100	100	5	< 1	< 1	1	100	100	8	< 1	< 1	1
	White Shark – Distribution*	100	100	5	< 1	< 1	1	100	100	8	< 1	< 1	1
EEZ	Australian*	100	100	5	< 1	< 1	1	100	100	8	< 1	< 1	1
IBRA	Otway Plain	2	-	-	13	-	-	5	-	-	17	-	-
IMCRA	Otway*	100	100	5	< 1	< 1	1	100	100	8	< 1	< 1	1
SHORE	Colac Otway	2	-	-	13	-	-	5	-	-	17	-	-
State Waters	Victoria State Waters	2	-	-	13	-	-	5	-	-	17	-	-
Sub-LGA	Cape Otway West	2	-	-	13	-	-	5	-	-	17	-	-

*The release location resides within the receptor boundaries.

Table 13-3 Summary of the maximum residence time of floating oil exposure for each individual grid cell within each individual receptor. Results are based on a 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March) Maximum residence time of floating oil exposure (days)			Winter (April to October) Maximum residence time of floating oil exposure (days)		
		Low	Moderate	High	Low	Moderate	High
BIA	Antipodean Albatross - Foraging*	12	5	-	12	4	< 1
	Black-browed Albatross - Foraging*	12	5	-	12	4	< 1
	Bullers Albatross - Foraging*	12	5	-	12	4	< 1
	Campbell Albatross – Foraging*	12	5	-	12	4	< 1
	Common Diving-petrel – Foraging*	12	5	-	12	4	< 1
	Indian Yellow-nosed Albatross – Foraging*	12	5	-	12	4	< 1
	Pygmy Blue Whale – Distribution*	12	5	-	12	4	< 1
	Pygmy Blue Whale - Foraging	1	-	-	< 1	-	-
	Pygmy Blue Whale - Foraging (annual high use area)*	12	5	-	12	4	< 1
	Short-tailed Shearwater - Foraging	1	-	-	1	-	-
	Shy Albatross – Foraging*	12	5	-	12	4	< 1
	Southern Right Whale - Known Core Range*	12	5	-	12	4	< 1
	Wandering Albatross – Foraging*	12	5	-	12	4	< 1
	Wedge-tailed Shearwater – Foraging*	12	5	-	12	4	< 1
	White Shark – Distribution*	12	5	-	12	4	< 1
EEZ	Australian*	12	5	-	12	4	< 1
IBRA	Otway Plain	< 1	-	-	< 1	-	-
IMCRA	Otway*	12	5	-	12	4	< 1
SHORE	Colac Otway	< 1	-	-	< 1	-	-
State Waters	Victoria State Waters	< 1	-	-	< 1	-	-
Sub-LGA	Cape Otway West	< 1	-	-	< 1	-	-

*The release location resides within the receptor boundaries.

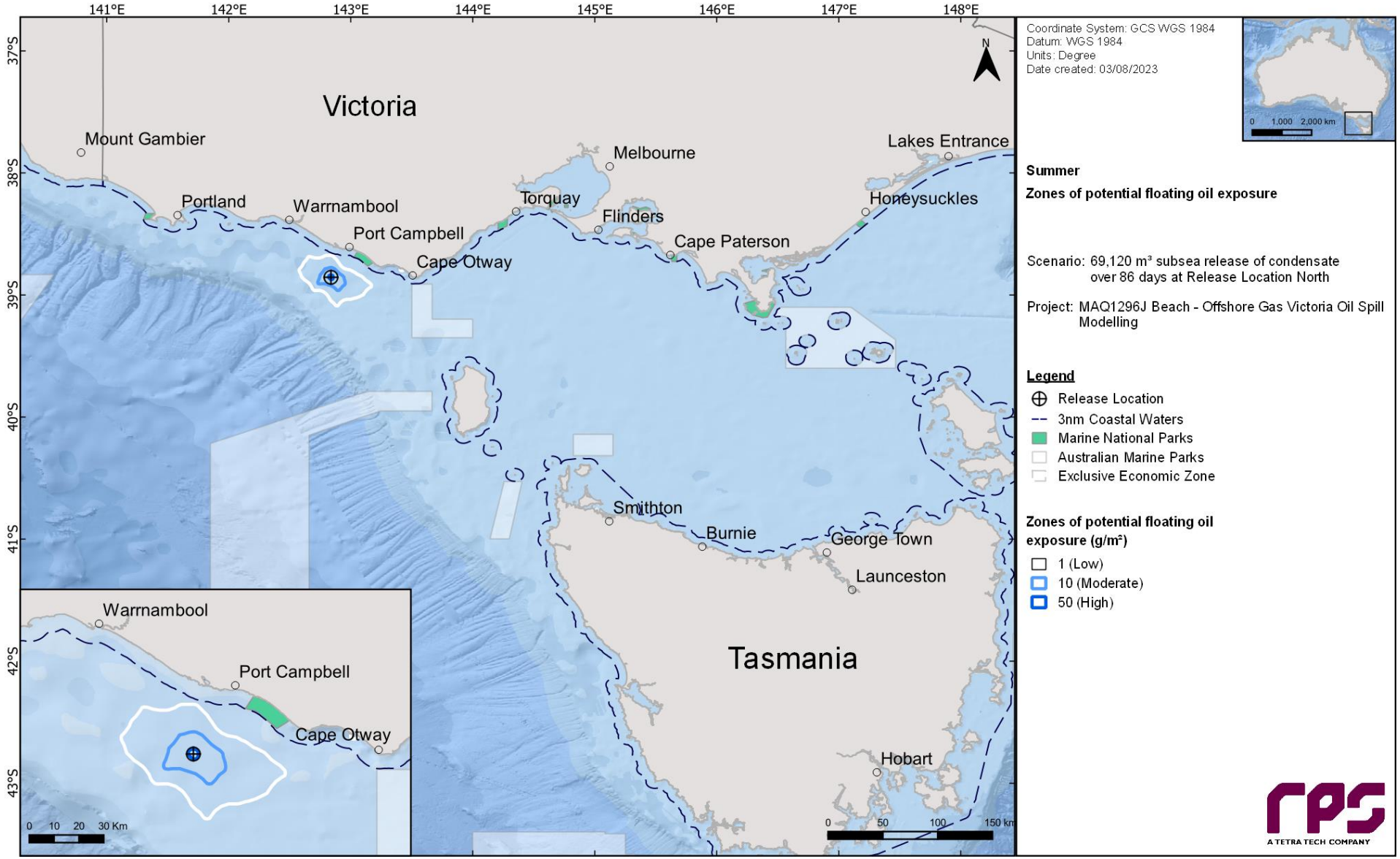

Figure 13-2 Zones of potential floating oil exposure in the event of a 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations during summer conditions.

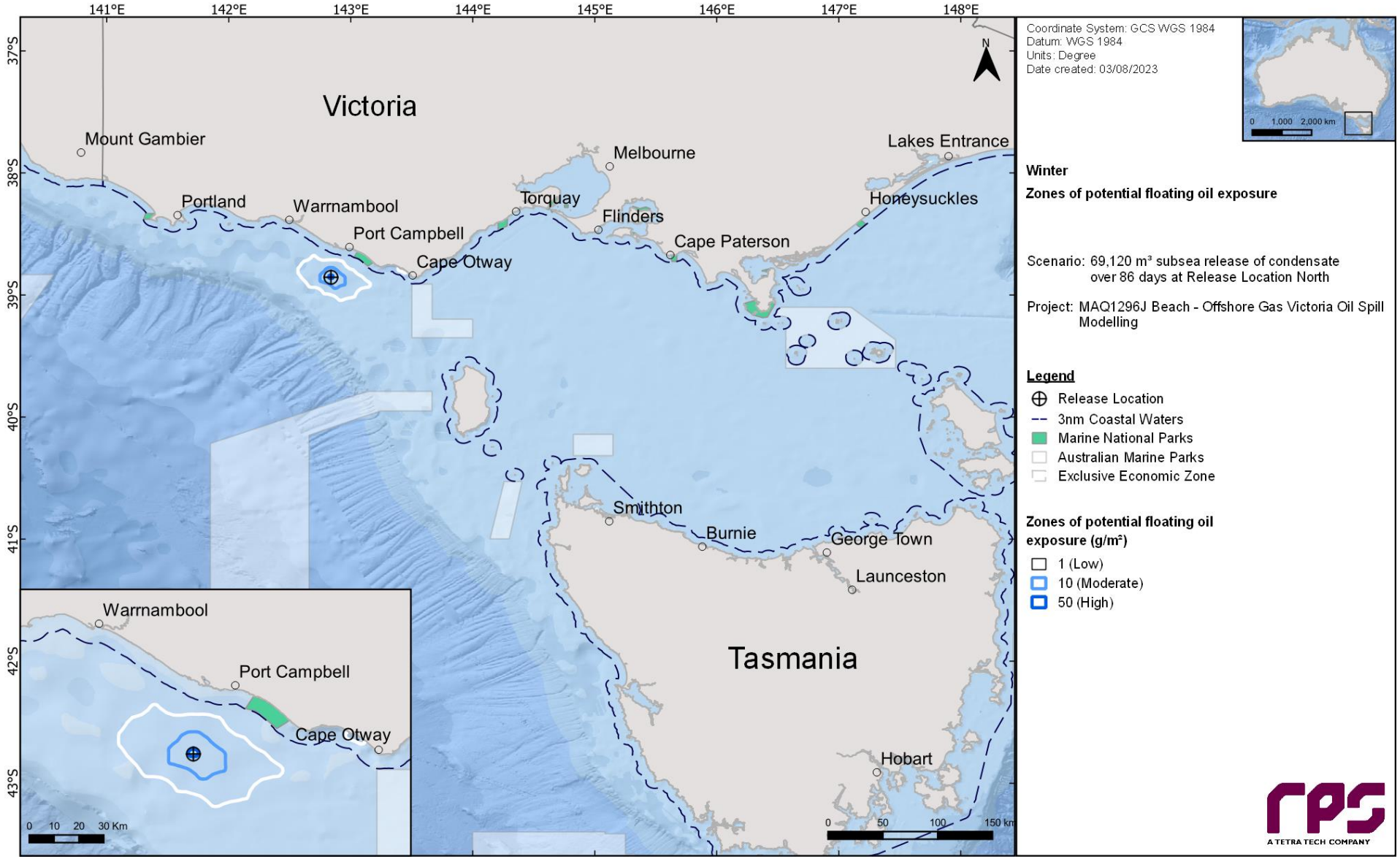

Figure 13-3 Zones of potential floating oil exposure in the event of a 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations during winter conditions.

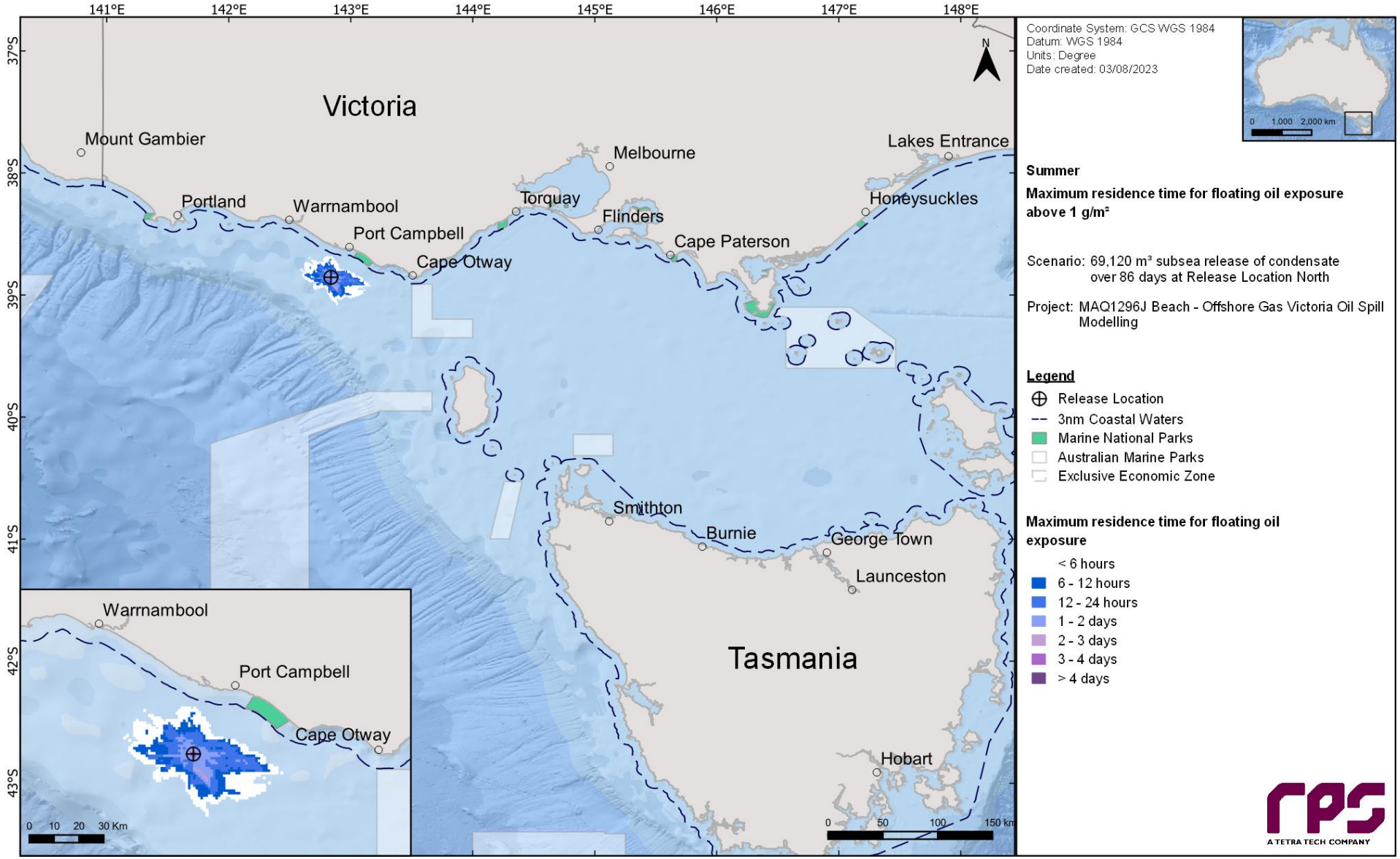

Figure 13-4 Maximum residence time of floating oil exposure above 1 g/m², in the event of 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations during summer conditions.

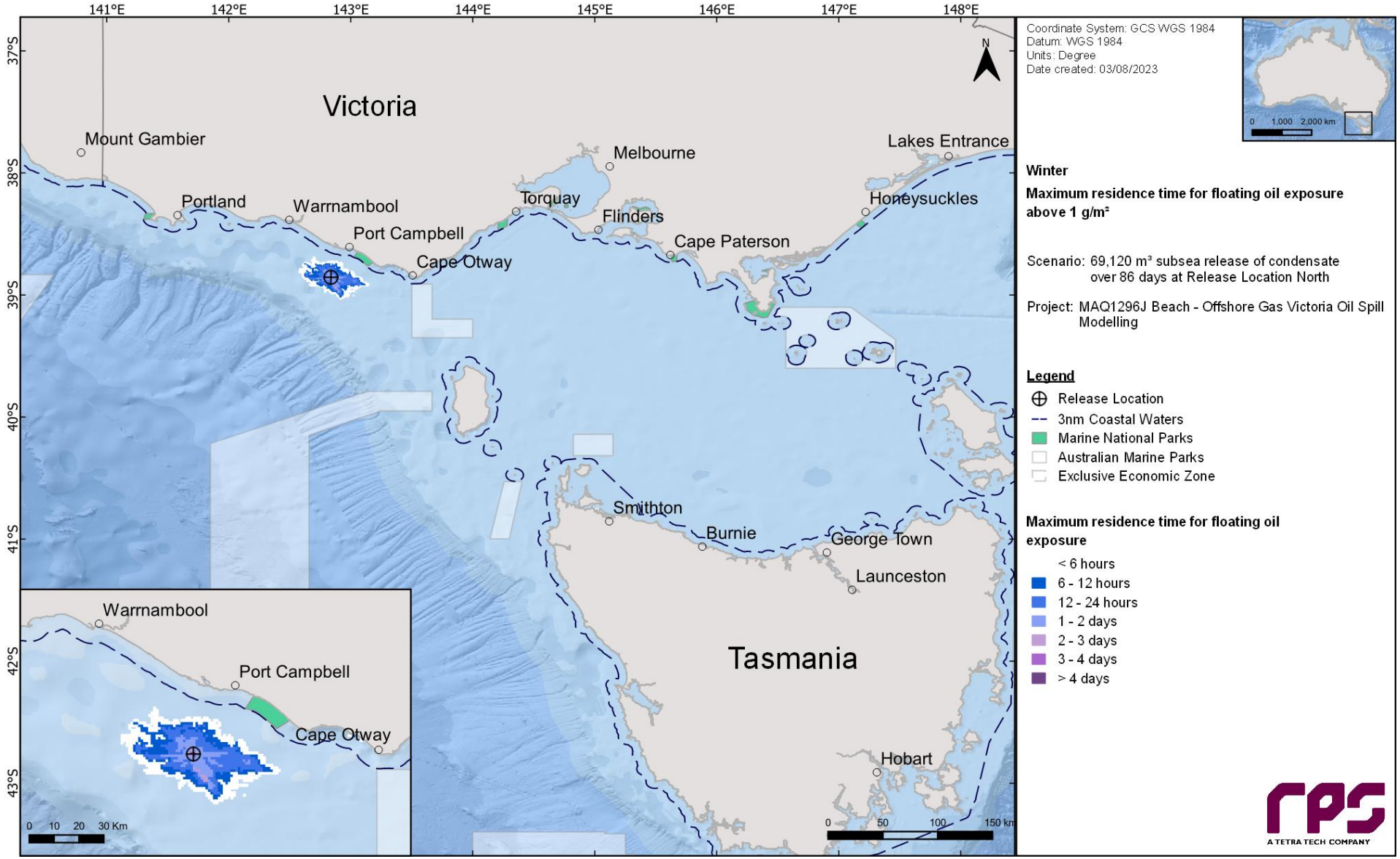

Figure 13-5 Maximum residence time of floating oil exposure above 1 g/m², in the event of 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations during winter conditions.

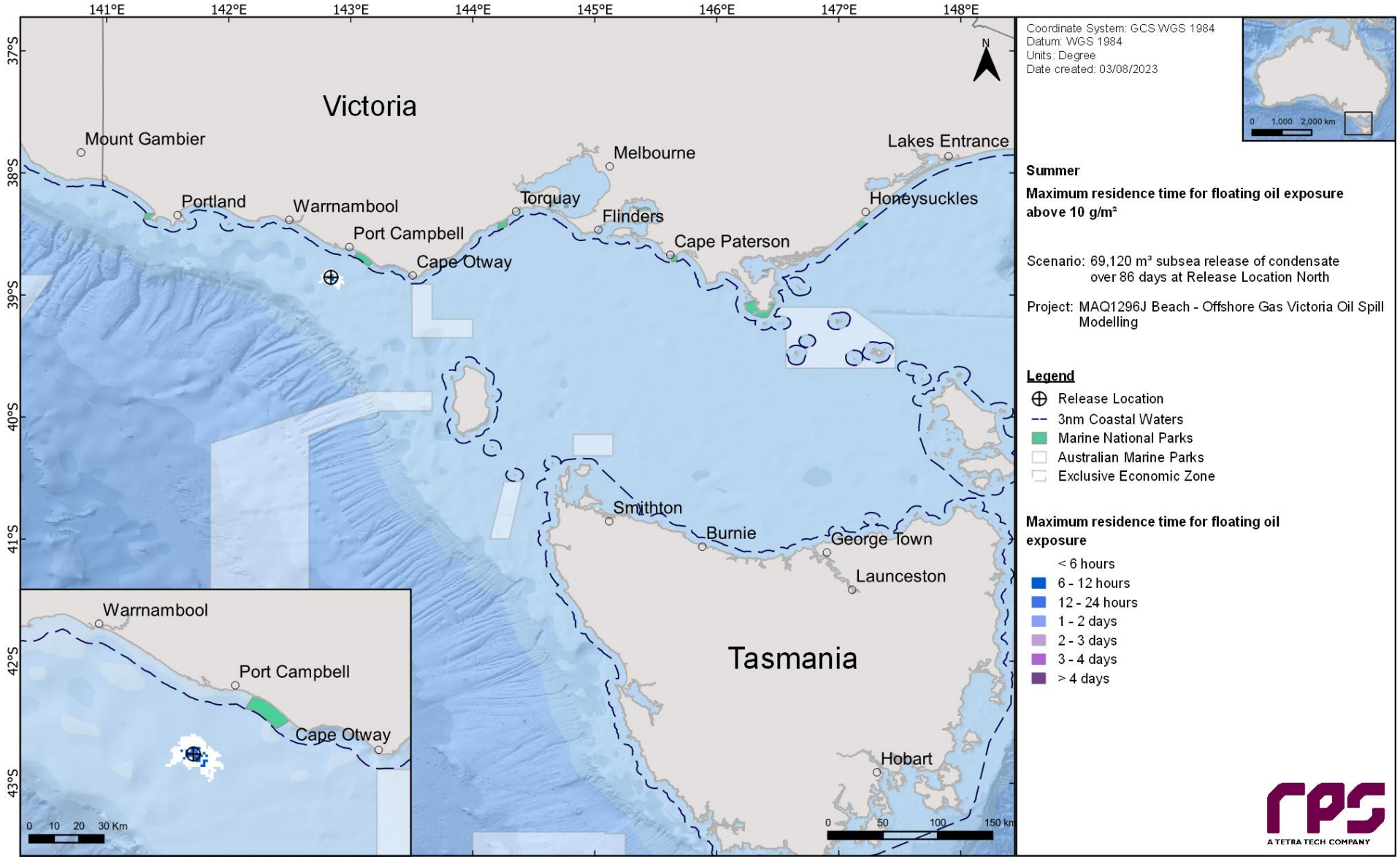

Figure 13-6 Maximum residence time of floating oil exposure above 10 g/m², in the event of 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations during summer conditions.

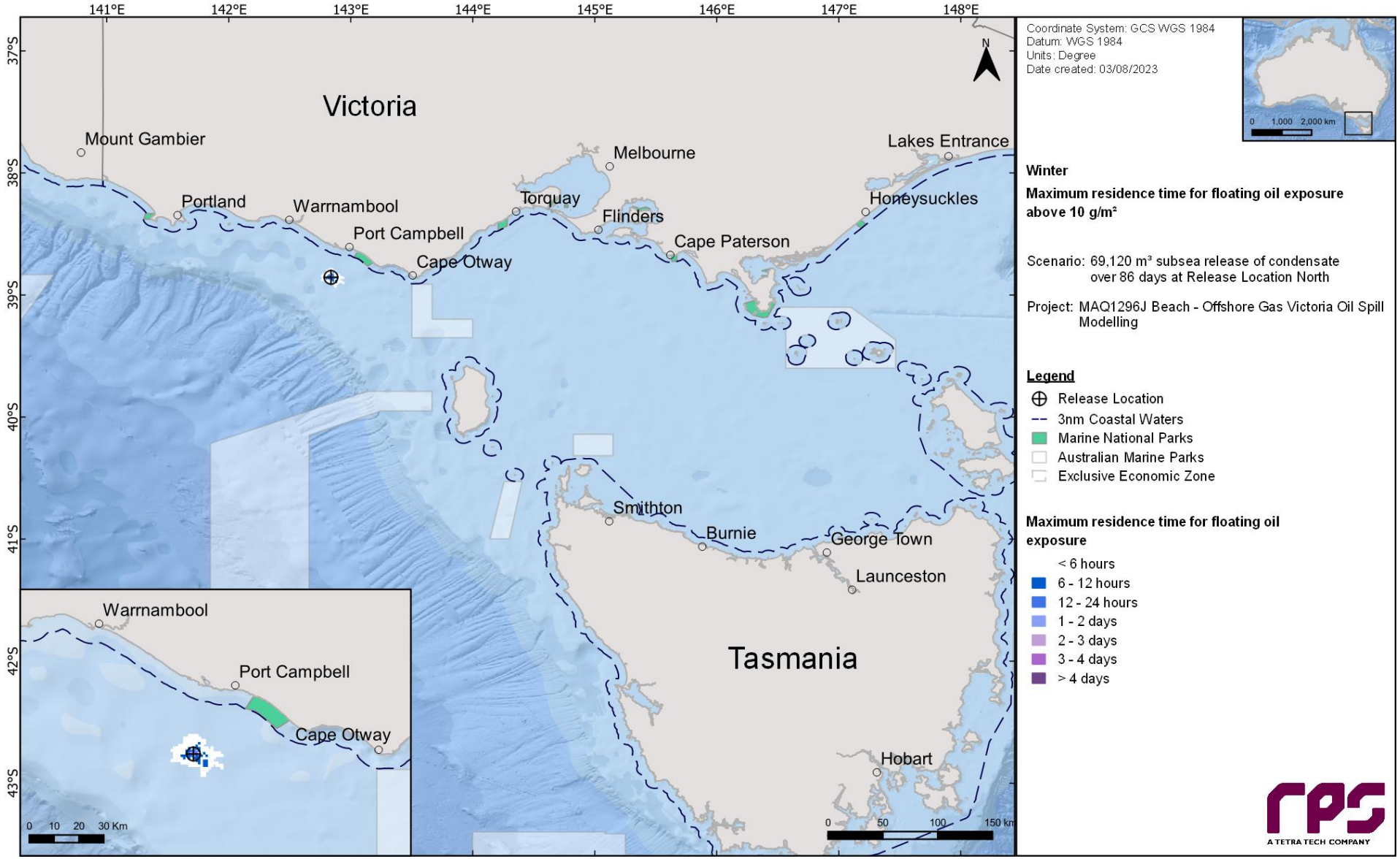

Figure 13-7 Maximum residence time of floating oil exposure above 10 g/m², in the event of 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations during winter conditions.

13.1.3 Shoreline Accumulation

Table 13-4 presents a summary of the predicted potential shoreline accumulation during the summer and winter conditions. The probability of accumulation to any shoreline at, or above, the low level (10 g/m^2) threshold was 100% during summer conditions and 98% during winter conditions. The minimum time before oil accumulation at, or above, the low threshold was 5 days during summer conditions, and 4 days during winter conditions. The maximum volume ashore for a single spill trajectory during the summer and winter conditions was 112 m^3 and 143 m^3, respectively, whilst the maximum length of shoreline accumulation at the low threshold was 108 km and 136 km, respectively. For the moderate threshold (100 g/m^2), the maximum length of shoreline accumulation predicted was 25 km (summer) and 24 km (winter). No shoreline accumulation was predicted for the high (1,000 g/m^2) threshold.

Table 13-5 summarises the shoreline accumulation on individual receptors during the summer and winter conditions. During summer, Colac Otway shoreline and Cape Otway West Sub-LGA shoreline recorded the highest probability of shoreline accumulation at the low threshold (96% for both in summer, and 96% and 93% respectively in winter).

The minimum time before shoreline accumulation above the low threshold was 5 days predicted for Colac Otway and Cape Otway West during summer conditions and 4 days during the winter conditions predicted for Colac Otway, Corangamite, Apollo Bay, Cape Otway West and Moonlight Head.

The summer and winter conditions maximum potential shoreline loading above the low, moderate and high shoreline thresholds are presented in Figure 13-8 and Figure 13-9, respectively.

Table 13-4 Summary of oil accumulation across all shorelines. Results are based on a 69,120.0 m^3 subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations per season.

Shoreline Statistics	Summer	Winter
Probability of accumulation on any shoreline (%)	100	98
Absolute minimum time for visible oil to shore (days)	5	4
Maximum total volume of hydrocarbons ashore (m^3)	112	143
Average volume of hydrocarbons ashore (m^3)	32	41
Maximum length of the shoreline at **10 g/m^2** (km)	108	136
Average shoreline length (km) at **10 g/m^2** (km)	39	52
Maximum length of the shoreline at **100 g/m^2** (km)	25	24
Average shoreline length (km) at **100 g/m^2** (km)	8	9
Maximum length of the shoreline at **1,000 g/m^2** (km)	-	-
Average shoreline length (km) at **1,000 g/m^2** (km)	-	-

Table 13-5 Summary of oil accumulation on individual shoreline receptors. Results are based on a 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations per season.

Shoreline Receptor		Summer																			Winter													
		Maximum probability of shoreline loading (%)			Minimum time before shoreline accumulation (days)			Load on shoreline (g/m²)		Volume on shoreline (m³)		Mean length of shoreline accumulation (km)			Maximum length of shoreline accumulation (km)			Maximum probability of shoreline loading (%)			Minimum time before shoreline accumulation (days)			Load on shoreline (g/m²)		Volume on shoreline (m³)		Mean length of shoreline accumulation (km)			Maximum length of shoreline accumulation (km)		
		Low	Mod	High	Low	Mod	High	Mean	Peak	Mean	Peak	Low	Mod	High	Low	Mod	High	Low	Mod	High	Low	Mod	High	Mean	Peak	Mean	Peak	Low	Mod	High	Low	Mod	High
SHORE	Anser Island	1	-	-	69	-	-	< 1	11	< 1	< 1	1	-	-	1	-	-	6	-	-	42	-	-	2	12	< 1	< 1	1	-	-	1	-	-
	Bass Coast	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15	-	-	14	-	-	1	32	0	2	2	-	-	4	-	-
	Colac Otway	96	72	-	5	7	-	22	823	25	96	27	7	-	60	22	-	96	54	-	4	7	-	22	873	27	94	31	9	-	67	20	-
	Corangamite	81	4	-	9	24	-	5	125	3	15	7	1	-	25	3	-	86	20	-	4	11	-	11	700	7	41	8	4	-	25	6	-
	French Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	34	-	-	< 1	14	< 1	1	1	-	-	1	-	-
	Glenelg	18	-	-	22	-	-	1	41	1	3	4	-	-	7	-	-	1	-	-	88	-	-	1	76	1	5	6	-	-	6	-	-
	Glennie Group	2	-	-	59	-	-	< 1	23	< 1	1	2	-	-	2	-	-	9	-	-	14	-	-	2	20	< 1	1	1	-	-	2	-	-
	Greater Geelong	5	-	-	73	-	-	< 1	20	< 1	2	2	-	-	4	-	-	6	-	-	47	-	-	< 1	19	< 1	2	1	-	-	3	-	-
	Kanowna Island	2	-	-	67	-	-	< 1	15	< 1	1	1	-	-	2	-	-	8	-	-	22	-	-	2	14	< 1	1	1	-	-	2	-	-
	King Island	18	4	-	43	50	-	< 1	244	1	8	2	1	-	7	1	-	14	6	-	20	28	-	2	206	1	8	4	1	-	9	1	-
	Mornington Peninsula	14	-	-	52	-	-	< 1	64	1	7	5	-	-	21	-	-	23	-	-	13	-	-	1	55	1	4	2	-	-	8	-	-
	Moyne	23	4	-	15	68	-	2	180	1	9	5	1	-	12	1	-	24	5	-	5	18	-	3	153	1	12	4	1	-	21	3	-
	Norman Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	19	-	-	1	11	< 1	< 1	1	-	-	1	-	-
	Phillip Island	14	-	-	50	-	-	< 1	40	< 1	2	2	-	-	3	-	-	45	8	-	13	33	-	2	185	1	6	3	1	-	10	1	-
	Seal Islands	1	-	-	73	-	-	< 1	11	< 1	< 1	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Skull Rock	2	-	-	67	-	-	< 1	15	< 1	< 1	1	-	-	1	-	-	6	-	-	22	-	-	2	14	< 1	< 1	1	-	-	1	-	-
	South Gippsland	3	-	-	59	-	-	< 1	21	< 1	3	3	-	-	6	-	-	48	3	-	13	52	-	2	136	1	5	3	1	-	8	1	-
	Surf Coast	12	3	-	24	56	-	1	132	1	6	7	1	-	12	1	-	29	-	-	23	-	-	3	87	2	13	11	-	-	35	-	-
	Warrnambool	2	-	-	64	-	-	< 1	13	< 1	1	1	-	-	1	-	-	2	-	-	8	-	-	1	25	< 1	1	1	-	-	2	-	-
Sub-LGA	Anglesea	6	-	-	50	-	-	1	31	< 1	2	5	-	-	6	-	-	17	-	-	23	-	-	3	61	1	5	6	-	-	15	-	-
	Apollo Bay	78	9	-	8	34	-	10	324	4	17	8	3	-	18	5	-	89	11	-	4	24	-	10	264	4	17	8	2	-	20	4	-
	Bay of Islands	21	4	-	15	68	-	3	180	1	8	4	1	-	9	1	-	23	5	-	5	18	-	3	153	1	9	3	1	-	15	3	-
	Cape Liptrap (NW)	3	-	-	59	-	-	< 1	21	< 1	1	3	-	-	5	-	-	34	-	-	13	-	-	2	42	< 1	1	2	-	-	4	-	-
	Cape Nelson	18	-	-	22	-	-	1	41	1	3	4	-	-	7	-	-	1	-	-	88	-	-	1	76	1	4	6	-	-	6	-	-
	Cape Otway West	96	71	-	5	7	-	41	823	19	63	16	6	-	25	13	-	93	53	-	4	7	-	43	873	20	86	17	8	-	28	15	-
	Cape Patton	43	3	-	10	45	-	4	168	2	13	7	3	-	19	4	-	69	3	-	10	65	-	7	143	3	11	8	2	-	18	2	-
	Childers Cove	9	-	-	53	-	-	1	15	< 1	1	2	-	-	4	-	-	2	-	-	7	-	-	2	27	< 1	3	5	-	-	8	-	-
	Kilcunda	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	18	-	-	< 1	13	< 1	1	1	-	-	1	-	-
	Lorne	23	6	-	15	40	-	3	210	1	10	4	2	-	15	4	-	31	8	-	24	61	-	5	170	2	9	9	1	-	18	2	-
	Moonlight Head	79	1	-	9	24	-	5	125	2	9	5	3	-	15	3	-	86	19	-	4	11	-	16	700	6	40	7	5	-	20	6	-
	Mornington Peninsula (S)	7	-	-	58	-	-	1	41	< 1	2	3	-	-	6	-	-	22	-	-	13	-	-	2	55	< 1	3	2	-	-	6	-	-
	Mornington Peninsula (SW)	13	-	-	52	-	-	1	64	< 1	4	4	-	-	14	-	-	13	-	-	13	-	-	1	33	< 1	2	2	-	-	4	-	-
	Port Campbell	30	3	-	13	69	-	3	116	1	7	6	1	-	12	1	-	22	1	-	7	45	-	2	123	1	7	4	1	-	11	1	-
	Port Fairy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	95	-	-	< 1	12	< 1	1	1	-	-	1	-	-
	Port Phillip (Queenscliff)	5	-	-	73	-	-	< 1	20	< 1	1	1	-	-	2	-	-	6	-	-	47	-	-	1	19	< 1	1	1	-	-	3	-	-
	Port Phillip (Sorrento Shore)	1	-	-	97	-	-	< 1	54	< 1	3	7	-	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Shoreline Receptor	Summer																			Winter												
	Maximum probability of shoreline loading (%)			Minimum time before shoreline accumulation (days)			Load on shoreline (g/m^2)		Volume on shoreline (m^3)		Mean length of shoreline accumulation (km)			Maximum length of shoreline accumulation (km)			Maximum probability of shoreline loading (%)			Minimum time before shoreline accumulation (days)			Load on shoreline (g/m^2)		Volume on shoreline (m^3)		Mean length of shoreline accumulation (km)			Maximum length of shoreline accumulation (km)		
	Low	Mod	High	Low	Mod	High	Mean	Peak	Mean	Peak	Low	Mod	High	Low	Mod	High	Low	Mod	High	Low	Mod	High	Mean	Peak	Mean	Peak	Low	Mod	High	Low	Mod	High
Port Phillip Heads	1	-	-	98	-	-	< 1	17	< 1	1	2	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Torquay	1	-	-	57	-	-	< 1	11	< 1	2	1	-	-	1	-	-	11	-	-	24	-	-	1	26	< 1	2	2	-	-	7	-	-
Venus Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15	-	-	14	-	-	1	32	< 1	1	1	-	-	3	-	-
Waratah Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	26	-	-	1	36	< 1	1	1	-	-	2	-	-
Wilsons Promontory (West)	1	-	-	60	-	-	< 1	17	< 1	2	1	-	-	1	-	-	38	3	-	29	52	-	2	136	1	4	2	1	-	5	1	-

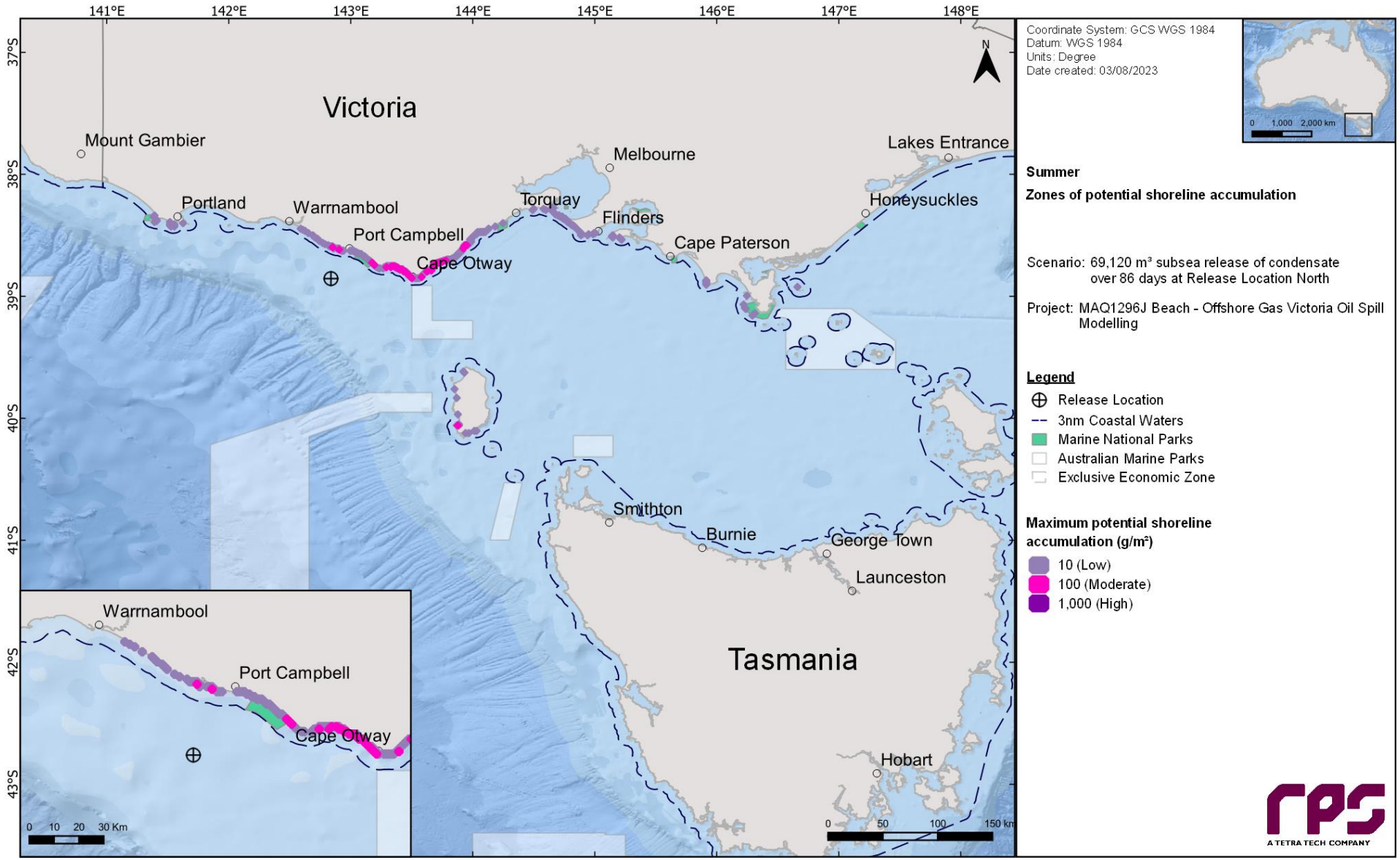

Figure 13-8 **Maximum potential shoreline loading in the event of a 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations during summer conditions.**

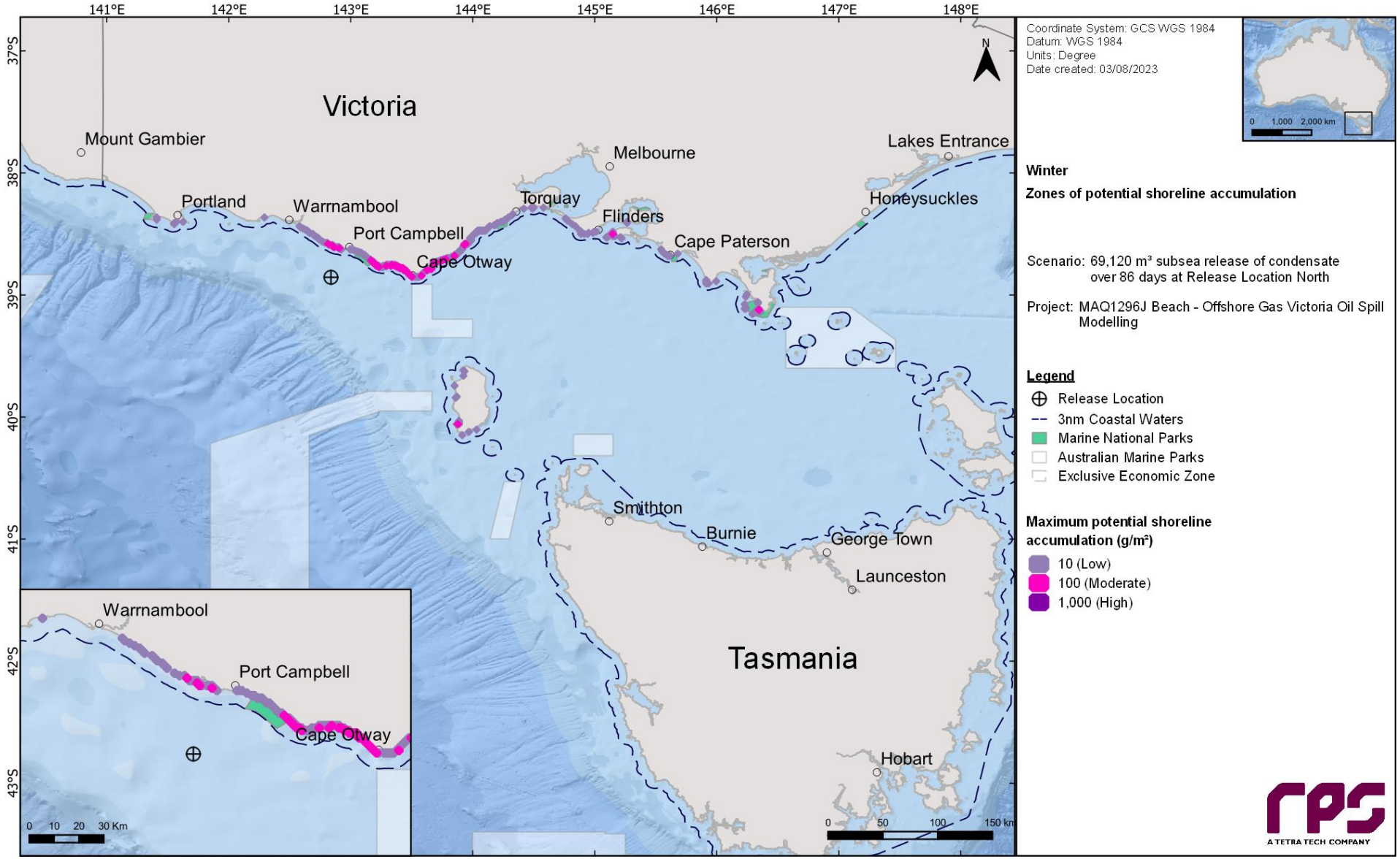

Figure 13-9 Maximum potential shoreline loading in the event of a 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations during winter conditions.

13.1.4 In-water exposure

13.1.4.1 Dissolved Hydrocarbons

Table 13-6 summarises the probability of exposure to individual receptors from dissolved hydrocarbons in the 0-10 m layer during the summer and winter conditions.

Outside of the receptors that the Release Location North resides within (refer to Table 10-3), the highest concentration of dissolved hydrocarbon was predicted for Pygmy Blue Whale - Foraging BIA (summer – 1,396 ppb, winter – 1,410 ppb), which also revealed the highest probability of low dissolved hydrocarbon exposure (100% for both seasons).

Table 13-7 presents the predicted minimum time to dissolved hydrocarbon exposure and maximum residence time for dissolved hydrocarbon exposure to individual receptors, in the 0-10 m depth layer, for all seasonal conditions and all thresholds assessed. The maximum residence time of dissolved hydrocarbon exposure at the low threshold predicted for receptors which the release location does not reside within was 1 day.

Figure 13-10 and Figure 13-11 present the zones of potential dissolved hydrocarbon exposure for the 0-10 m depth layer, for each threshold assessed under summer and winter conditions, respectively.

Figure 13-12 to Figure 13.17 present the maximum residence time of dissolved hydrocarbon exposure for the NOPSEMA thresholds in summer and winter.

Table 13-6 Probability of dissolved hydrocarbons exposure to marine based receptors in the 0–10 m dept. Results are based on a 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March)				Winter (April to October)			
		Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure			Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure		
			Low	Moderate	High		Low	Moderate	High
AMP	Apollo	789	96	77	3	984	100	98	6
	Beagle	77	3	1	-	76	6	1	-
	Zeehan	75	6	1	-	70	3	1	-
BIA	Antipodean Albatross - Foraging*	1,796	100	100	99	1,709	100	100	90
	Australasian Gannet - Foraging	453	44	14	1	324	39	8	-
	Black-browed Albatross - Foraging*	1,796	100	100	99	1,709	100	100	90
	Black-faced Cormorant - Foraging	23	1	-	-	12	1	-	-
	Bullers Albatross - Foraging*	1,796	100	100	99	1,709	100	100	90
	Campbell Albatross – Foraging*	1,796	100	100	99	1,709	100	100	90
	Common Diving-petrel – Foraging*	1,796	100	100	99	1,709	100	100	90
	Indian Yellow-nosed Albatross – Foraging*	1,796	100	100	99	1,709	100	100	90
	Little Penguin - Foraging	97	5	1	-	151	13	2	-
	Pygmy Blue Whale – Distribution*	1,796	100	100	99	1,709	100	100	90
	Pygmy Blue Whale - Foraging	1,396	100	100	11	1,410	100	100	12
	Pygmy Blue Whale - Foraging (annual high use area)*	1,796	100	100	99	1,709	100	100	90
	Pygmy Blue Whale - Known Foraging Area	1,076	96	69	3	1,216	100	96	4
	Short-tailed Shearwater - Foraging	1,678	100	100	14	1,410	100	100	18
	Shy Albatross – Foraging*	1,796	100	100	99	1,709	100	100	90
	Southern Right Whale - Aggregation	740	91	67	3	840	68	41	2
	Southern Right Whale - Connecting habitat	18	1	-	-	10	1	-	-
	Southern Right Whale - Known Core Range*	1,796	100	100	99	1,709	100	100	90
	Wandering Albatross – Foraging*	1,796	100	100	99	1,709	100	100	90
	Wedge-tailed Shearwater – Foraging*	1,796	100	100	99	1,709	100	100	90
	White Shark - Breeding	92	2	1	-	39	3	-	-
	White Shark – Distribution*	1,796	100	100	99	1,709	100	100	90

Receptor		Summer (November through to March)				Winter (April to October)			
		Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure			Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure		
			Low	Moderate	High		Low	Moderate	High
	White Shark - Foraging	520	57	27	2	320	34	7	-
	White-faced Storm-petrel - Foraging	1,076	96	68	3	1,216	100	93	3
EEZ	Australian*	1,796	100	100	99	1,709	100	100	90
IBRA	Flinders	15	1	-	-	9	-	-	-
	Gippsland Plain	57	3	1	-	84	5	1	-
	Glenelg Plain	18	3	-	-	9	-	-	-
	King Island	17	1	-	-	9	-	-	-
	Otway Plain	812	94	44	2	363	97	55	-
	Otway Ranges	887	87	28	1	320	96	40	-
	Strzelecki Ranges	36	2	-	-	21	5	-	-
	Warrnambool Plain	228	75	14	-	177	76	16	-
	Wilsons Promontory	170	4	2	-	41	7	-	-
IMCRA	Central Bass Strait	1,076	90	54	3	1,216	100	89	3
	Central Victoria	865	96	69	2	801	100	96	4
	Flinders	271	6	2	-	95	11	1	-
	Otway*	1,796	100	100	99	1,709	100	100	90
	Twofold Shelf	31	2	-	-	43	4	-	-
	Victorian Embayments	14	1	-	-	22	3	-	-
KEF	Bonney Coast Upwelling	177	28	4	-	41	2	-	-
	Upwelling East of Eden	11	1	-	-	15	1	-	-
	West Tasmania Canyons	303	13	3	-	176	8	2	-
MNP	Bunurong	83	1	1	-	32	5	-	-
	Discovery Bay	11	1	-	-	3	-	-	-
	Point Addis	20	2	-	-	67	8	1	-
	Port Phillip Heads	12	1	-	-	18	2	-	-
	Twelve Apostles	299	75	16	-	182	72	10	-
	Wilsons Promontory	271	3	2	-	35	7	-	-

Receptor		Summer (November through to March)				Winter (April to October)			
		Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure			Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure		
			Low	Moderate	High		Low	Moderate	High
MS	Mushroom Reef	6	-	-	-	11	1	-	-
NPS4	Bunurong Marine Park	31	1	-	-	46	3	-	-
	Wilsons Promontory Marine Park	16	1	-	-	11	1	-	-
RAMSAR	Port Phillip Bay	5	-	-	-	18	1	-	-
RSB	Bravenes Rock	302	95	38	-	258	97	47	-
	Cody Bank	62	4	1	-	40	14	-	-
SHORE	Anser Island	170	2	1	-	16	3	-	-
	Bass Coast	57	1	1	-	46	4	-	-
	Colac Otway	887	94	44	2	363	97	55	-
	Corangamite	351	75	17	-	177	79	17	-
	Glenelg	18	3	-	-	9	-	-	-
	Glennie Group	117	4	1	-	37	4	-	-
	Greater Geelong	16	1	-	-	18	1	-	-
	Hogan Island Group	15	1	-	-	9	-	-	-
	Kanowna Island	113	3	2	-	26	7	-	-
	King Island	17	1	-	-	9	-	-	-
	Lady Julia Percy Island	31	4	-	-	8	-	-	-
	Laurence Rocks	22	3	-	-	3	-	-	-
	Moncoeur Islands	24	2	-	-	37	7	-	-
	Mornington Peninsula	12	1	-	-	59	4	1	-
	Moyne	101	33	3	-	60	16	1	-
	Norman Island	40	2	-	-	13	2	-	-
	Phillip Island	62	3	1	-	29	5	-	-
	Rodondo Island	36	3	-	-	41	6	-	-
	Seal Islands	51	1	1	-	13	1	-	-
	Shellback Island	19	1	-	-	11	1	-	-
	Skull Rock	113	2	2	-	28	4	-	-

Receptor		Summer (November through to March)				Winter (April to October)			
		Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure			Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure		
			Low	Moderate	High		Low	Moderate	High
	South Gippsland	170	2	1	-	84	5	1	-
	Surf Coast	29	3	-	-	37	12	-	-
	Warrnambool	32	3	-	-	10	1	-	-
State Waters	Tasmania	26	2	-	-	25	2	-	-
	Victoria	887	97	63	4	578	100	86	2
Sub-LGA	Anglesea	10	1	-	-	28	4	-	-
	Apollo Bay	887	91	28	1	320	97	40	-
	Bay of Islands	101	33	3	-	60	16	1	-
	Cape Liptrap	26	1	-	-	84	5	1	-
	Cape Nelson	18	3	-	-	9	-	-	-
	Cape Otway West	488	94	48	3	363	97	55	-
	Cape Patton	291	29	4	-	217	63	9	-
	Childers Cove	38	7	-	-	16	1	-	-
	French Island / San Remo	16	1	-	-	7	-	-	-
	Kilcunda	19	1	-	-	42	2	-	-
	Lorne	32	5	-	-	37	12	-	-
	Moonlight Head	351	75	17	-	177	79	17	-
	Mornington Peninsula (S)	8	-	-	-	59	4	1	-
	Mornington Peninsula (SW)	9	-	-	-	57	4	1	-
	Port Campbell	130	34	5	-	56	17	1	-
	Port Fairy	10	1	-	-	8	-	-	-
	Port Phillip (Queenscliff)	16	1	-	-	13	1	-	-
	Port Phillip (Sorrento Shore)	12	1	-	-	25	4	-	-
	Port Phillip Heads	8	-	-	-	18	1	-	-
	Torquay	16	1	-	-	14	2	-	-
	Venus Bay	57	1	1	-	46	4	-	-
	Waratah Bay	36	2	-	-	21	5	-	-

Receptor		Summer (November through to March)				Winter (April to October)			
		Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure			Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure		
			Low	Moderate	High		Low	Moderate	High
	Warrnambool	15	2	-	-	8	-	-	-
	Westernport	6	-	-	-	21	1	-	-
	Wilsons Promontory (East)	48	2	-	-	21	3	-	-
	Wilsons Promontory (West)	170	2	1	-	27	3	-	-

*The release location resides within the receptor boundaries.

Table 13-7 Predicted minimum time to dissolved hydrocarbon exposure and maximum residence time for dissolved hydrocarbon exposure to individual receptors in the 0-10 m depth layer. Results are based on a 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill trajectories per season.

Receptor		Summer (November through to March)						Winter (April to October)					
		Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)			Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
AMP	Apollo	2	3	3	1	< 1	< 1	1	1	3	1	< 1	< 1
	Beagle	55	64	-	< 1	< 1	-	17	49	-	< 1	< 1	-
	Zeehan	14	14	-	< 1	< 1	-	16	17	-	< 1	< 1	-
BIA	Antipodean Albatross - Foraging*	< 1	< 1	< 1	26	8	< 1	< 1	< 1	< 1	27	9	< 1
	Australasian Gannet - Foraging	5	7	14	< 1	< 1	< 1	7	8	-	< 1	< 1	-
	Black-browed Albatross - Foraging*	< 1	< 1	< 1	26	8	< 1	< 1	< 1	< 1	27	9	< 1
	Black-faced Cormorant - Foraging	42	-	-	< 1	-	-	25	-	-	< 1	-	-
	Bullers Albatross - Foraging*	< 1	< 1	< 1	26	8	< 1	< 1	< 1	< 1	27	9	< 1
	Campbell Albatross – Foraging*	< 1	< 1	< 1	26	8	< 1	< 1	< 1	< 1	27	9	< 1
	Common Diving-petrel – Foraging*	< 1	< 1	< 1	26	8	< 1	< 1	< 1	< 1	27	9	< 1
	Indian Yellow-nosed Albatross – Foraging*	< 1	< 1	< 1	26	8	< 1	< 1	< 1	< 1	27	9	< 1
	Little Penguin - Foraging	44	55	-	< 1	< 1	-	9	25	-	< 1	< 1	-
	Pygmy Blue Whale – Distribution*	< 1	< 1	< 1	26	8	< 1	< 1	< 1	< 1	27	9	< 1
	Pygmy Blue Whale - Foraging	1	1	2	1	1	< 1	1	1	2	1	1	< 1
	Pygmy Blue Whale - Foraging (annual high use area)*	< 1	< 1	< 1	26	8	< 1	< 1	< 1	< 1	27	9	< 1
	Pygmy Blue Whale - Known Foraging Area	3	3	3	1	< 1	< 1	1	1	3	1	< 1	< 1
	Short-tailed Shearwater - Foraging	< 1	1	2	1	1	< 1	< 1	1	2	2	1	< 1
	Shy Albatross – Foraging*	< 1	< 1	< 1	26	8	< 1	< 1	< 1	< 1	27	9	< 1
	Southern Right Whale - Aggregation	2	2	3	1	< 1	< 1	1	2	10	1	1	< 1
	Southern Right Whale - Connecting habitat	40	-	-	< 1	-	-	26	-	-	< 1	-	-
	Southern Right Whale - Known Core Range*	< 1	< 1	< 1	26	8	< 1	< 1	< 1	< 1	27	9	< 1
	Wandering Albatross – Foraging*	< 1	< 1	< 1	26	8	< 1	< 1	< 1	< 1	27	9	< 1
	Wedge-tailed Shearwater – Foraging*	< 1	< 1	< 1	26	8	< 1	< 1	< 1	< 1	27	9	< 1

Receptor		Summer (November through to March)						Winter (April to October)					
		Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)			Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
	White Shark - Breeding	56	99	-	< 1	< 1	-	33	-	-	< 1	-	-
	White Shark – Distribution*	< 1	< 1	< 1	26	8	< 1	< 1	< 1	< 1	27	9	< 1
	White Shark - Foraging	4	5	14	< 1	< 1	< 1	7	8	-	< 1	< 1	-
	White-faced Storm-petrel - Foraging	3	3	3	1	< 1	< 1	1	2	3	1	< 1	< 1
EEZ	Australian*	< 1	< 1	< 1	26	8	< 1	< 1	< 1	< 1	27	9	< 1
IBRA	Flinders	59	-	-	< 1	-	-	81	-	-	< 1	-	-
	Gippsland Plain	55	65	-	< 1	< 1	-	11	20	-	< 1	< 1	-
	Glenelg Plain	45	-	-	< 1	-	-	-	-	-	-	-	-
	King Island	42	-	-	< 1	-	-	26	-	-	< 1	-	-
	Otway Plain	4	5	9	< 1	< 1	< 1	2	2	-	< 1	< 1	-
	Otway Ranges	4	5	19	< 1	< 1	< 1	2	4	-	< 1	< 1	-
	Strzelecki Ranges	36	-	-	< 1	-	-	31	-	-	< 1	-	-
	Warrnambool Plain	7	13	-	< 1	< 1	-	3	9	-	< 1	< 1	-
	Wilsons Promontory	56	56	-	< 1	< 1	-	10	29	-	< 1	< 1	-
IMCRA	Central Bass Strait	3	3	5	1	< 1	< 1	2	2	3	1	< 1	< 1
	Central Victoria	3	3	3	1	< 1	< 1	1	1	4	1	< 1	< 1
	Flinders	36	55	-	< 1	< 1	-	9	26	-	< 1	< 1	-
	Otway	< 1	< 1	< 1	26	8	< 1	< 1	< 1	< 1	27	9	< 1
	Twofold Shelf	57	-	-	< 1	-	-	26	-	-	< 1	-	-
	Victorian Embayments	56	-	-	< 1	-	-	17	-	-	< 1	-	-
KEF	Bonney Coast Upwelling	10	15	-	< 1	< 1	-	79	81	-	< 1	< 1	-
	Upwelling East of Eden	81	-	-	< 1	-	-	54	-	-	< 1	-	-
	West Tasmania Canyons	7	11	-	< 1	< 1	-	12	12	-	< 1	< 1	-
MNP	Bunurong	64	65	-	< 1	< 1	-	40	-	-	< 1	-	-
	Discovery Bay	57	-	-	< 1	-	-	-	-	-	-	-	-
	Point Addis	57	-	-	< 1	-	-	15	28	-	< 1	< 1	-
	Port Phillip Heads	71	-	-	< 1	-	-	29	-	-	< 1	-	-

Receptor		Summer (November through to March)						Winter (April to October)					
		Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)			Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
	Twelve Apostles	4	8	-	< 1	< 1	-	5	7	-	< 1	< 1	-
	Wilsons Promontory	55	56	-	< 1	< 1	-	10	48	-	< 1	< 1	-
MS	Mushroom Reef	94	-	-	< 1	-	-	18	-	-	< 1	-	-
NPS4	Bunurong Marine Park	64	67	-	< 1	< 1	-	40	-	-	< 1	-	-
	Wilsons Promontory Marine Park	60	-	-	< 1	-	-	38	-	-	< 1	-	-
RAMSAR	Port Phillip Bay	-	-	-	-	-	-	89	-	-	< 1	-	-
RSB	Bravenes Rock	4	4	-	< 1	< 1	-	3	3	14	< 1	< 1	< 1
	Cody Bank	54	54	-	< 1	< 1	-	10	34	-	< 1	< 1	-
SHORE	Anser Island	56	56	-	< 1	< 1	-	33	-	-	< 1	-	-
	Bass Coast	56	65	-	< 1	< 1	-	40	-	-	< 1	-	-
	Colac Otway	4	5	9	< 1	< 1	< 1	2	2	-	< 1	< 1	-
	Corangamite	4	13	-	< 1	< 1	-	3	7	-	< 1	< 1	-
	Glenelg	45	-	-	< 1	-	-	-	-	-	-	-	-
	Glennie Group	56	56	-	< 1	< 1	-	10	-	-	< 1	-	-
	Greater Geelong	71	-	-	< 1	-	-	48	-	-	< 1	-	-
	Hogan Island Group	62	-	-	< 1	-	-	81	-	-	< 1	-	-
	Kanowna Island	56	56	-	< 1	< 1	-	27	-	-	< 1	-	-
	King Island	42	-	-	< 1	-	-	26	-	-	< 1	-	-
	Lady Julia Percy Island	24	-	-	< 1	-	-	-	-	-	-	-	-
	Laurence Rocks	56	-	-	< 1	-	-	-	-	-	-	-	-
	Moncoeur Islands	57	98	-	< 1	< 1	-	26	29	-	< 1	< 1	-
	Mornington Peninsula	71	-	-	< 1	-	-	11	20	-	< 1	< 1	-
	Moyne	8	22	-	< 1	< 1	-	3	10	-	< 1	< 1	-
	Norman Island	56	-	-	< 1	-	-	33	-	-	< 1	-	-
	Phillip Island	55	55	-	< 1	< 1	-	17	-	-	< 1	-	-
	Rodondo Island	56	-	-	< 1	-	-	25	99	-	< 1	-	-
	Seal Islands	64	99	-	< 1	< 1	-	86	-	-	< 1	-	-

Receptor		Summer (November through to March)						Winter (April to October)					
		Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)			Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
	Shellback Island	56	-	-	< 1	-	-	37	-	-	< 1	-	-
	Skull Rock	56	56	-	< 1	< 1	-	26	82	-	< 1	< 1	-
	South Gippsland	36	56	-	< 1	< 1	-	16	31	-	< 1	< 1	-
	Surf Coast	41	-	-	< 1	-	-	19	28	-	< 1	< 1	-
	Warrnambool	32	-	-	< 1	-	-	10	-	-	< 1	-	-
State Waters	Tasmania	38	-	-	< 1	-	-	26	-	-	< 1	-	-
	Victoria	3	4	6	1	< 1	< 1	1	2	4	1	< 1	< 1
Sub-LGA	Anglesea	54	-	-	< 1	-	-	22	-	-	< 1	-	-
	Apollo Bay	4	5	19	< 1	< 1	< 1	2	4	-	< 1	< 1	-
	Bay of Islands	8	22	-	< 1	< 1	-	4	10	-	< 1	< 1	-
	Cape Liptrap	55	-	-	< 1	-	-	16	31	-	< 1	< 1	-
	Cape Nelson	45	-	-	< 1	-	-	-	-	-	-	-	-
	Cape Otway West	4	5	9	< 1	< 1	< 1	2	2	-	< 1	< 1	-
	Cape Patton	6	11	-	< 1	< 1	-	5	5	-	< 1	< 1	-
	Childers Cove	18	-	-	< 1	-	-	10	-	-	< 1	-	-
	French Island / San Remo	56	-	-	< 1	-	-	-	-	-	-	-	-
	Kilcunda	56	-	-	< 1	-	-	40	-	-	< 1	-	-
	Lorne	21	-	-	< 1	-	-	19	28	-	< 1	< 1	-
	Moonlight Head	4	13	-	< 1	< 1	-	3	7	-	< 1	< 1	-
	Mornington Peninsula (S)	94	-	-	< 1	-	-	16	20	-	< 1	< 1	-
	Mornington Peninsula (SW)	74	-	-	< 1	-	-	11	33	-	< 1	< 1	-
	Port Campbell	7	14	-	< 1	< 1	-	4	19	-	< 1	< 1	-
	Port Fairy	33	-	-	< 1	-	-	90	-	-	< 1	-	-
	Port Phillip (Queenscliff)	71	-	-	< 1	-	-	48	-	-	< 1	-	-
	Port Phillip (Sorrento Shore)	71	-	-	< 1	-	-	29	-	-	< 1	-	-
	Port Phillip Heads	-	-	-	-	-	-	89	-	-	< 1	-	-
	Torquay	70	-	-	< 1	-	-	37	-	-	< 1	-	-

Receptor	Summer (November through to March)						Winter (April to October)					
	Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)			Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)		
	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
Venus Bay	64	65	-	< 1	< 1	-	40	-	-	< 1	-	-
Waratah Bay	36	-	-	< 1	-	-	31	-	-	< 1	-	-
Warrnambool	34	-	-	< 1	-	-	-	-	-	-	-	-
Westernport	-	-	-	-	-	-	18	-	-	< 1	-	-
Wilsons Promontory (East)	56	64	-	< 1	< 1	-	38	-	-	< 1	-	-
Wilsons Promontory (West)	56	56	-	< 1	< 1	-	36	-	-	< 1	-	-

*The release location resides within the receptor boundaries.

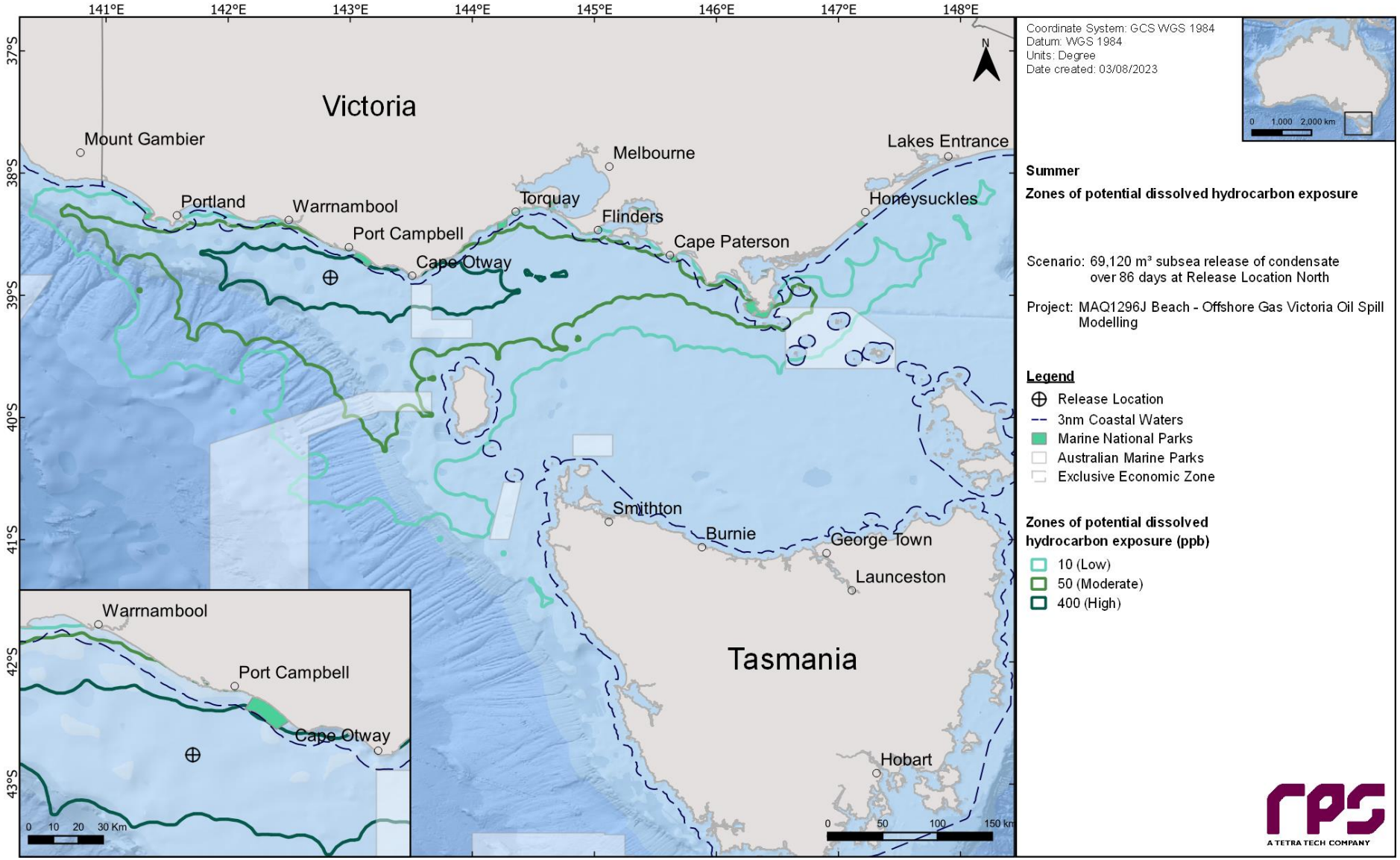

Figure 13-10 Zones of potential dissolved hydrocarbon exposure at 0-10 m below the sea in the event of a 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations during summer conditions.

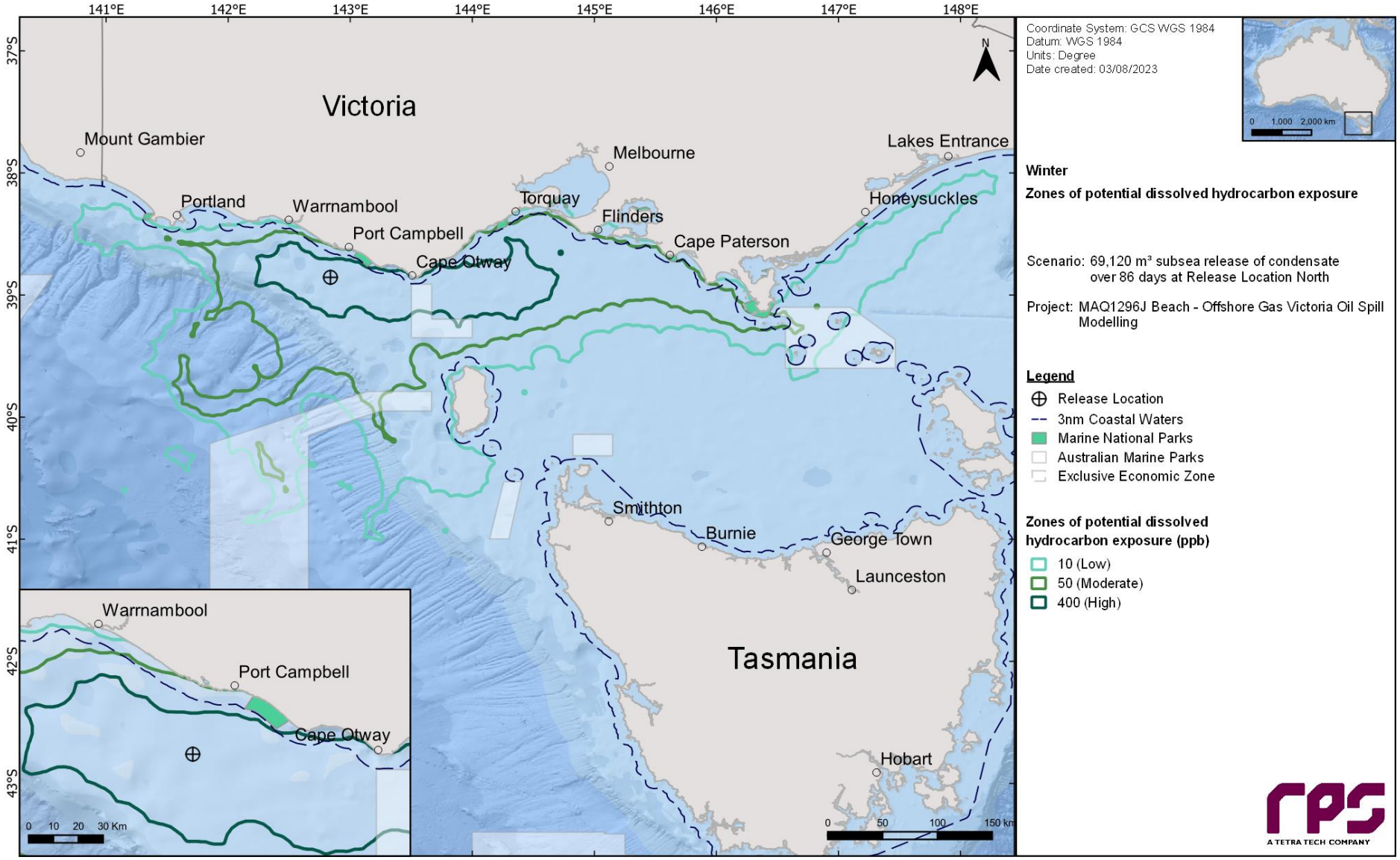

Figure 13-11 Zones of potential dissolved hydrocarbon exposure at 0-10 m below the sea in the event of a 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations during winter conditions.

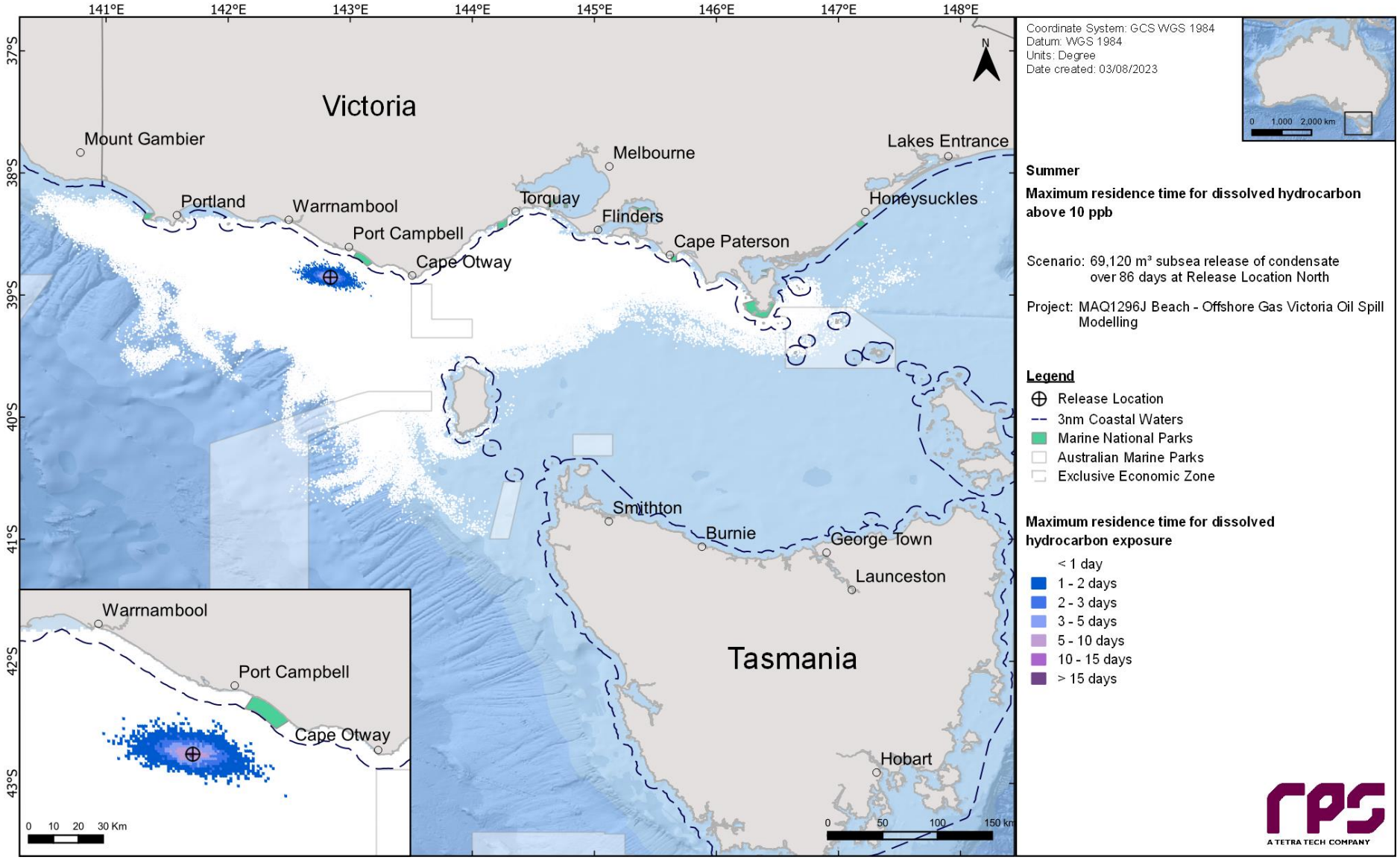

Figure 13-12 Maximum residence time for dissolved hydrocarbon exposure above 10 ppb, at 0-10 m below the sea surface in the event of a 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations during summer conditions.

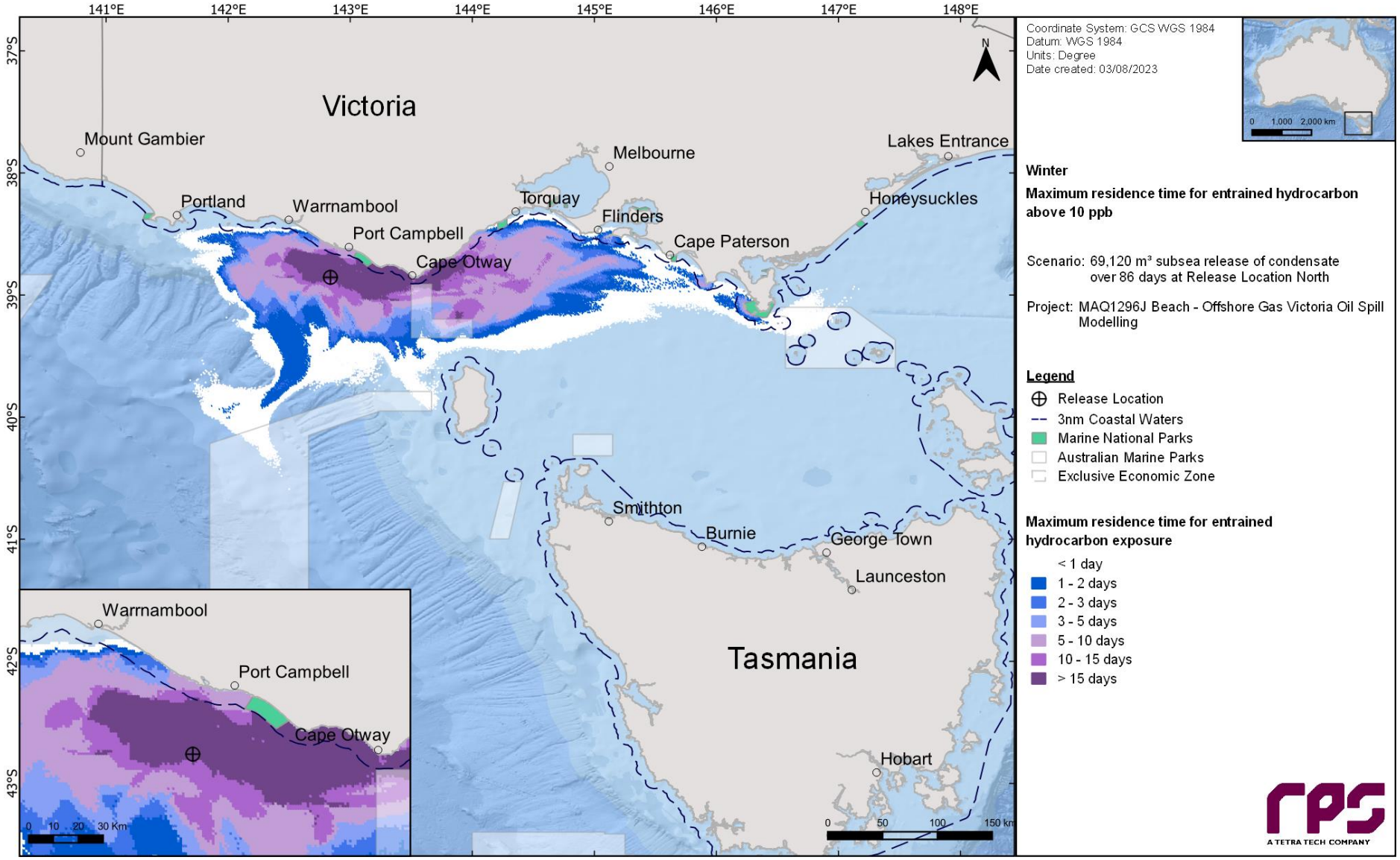

Figure 13.13 Maximum residence time for dissolved hydrocarbon exposure above 10 ppb, at 0-10 m below the sea surface in the event of a 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations during winter conditions.

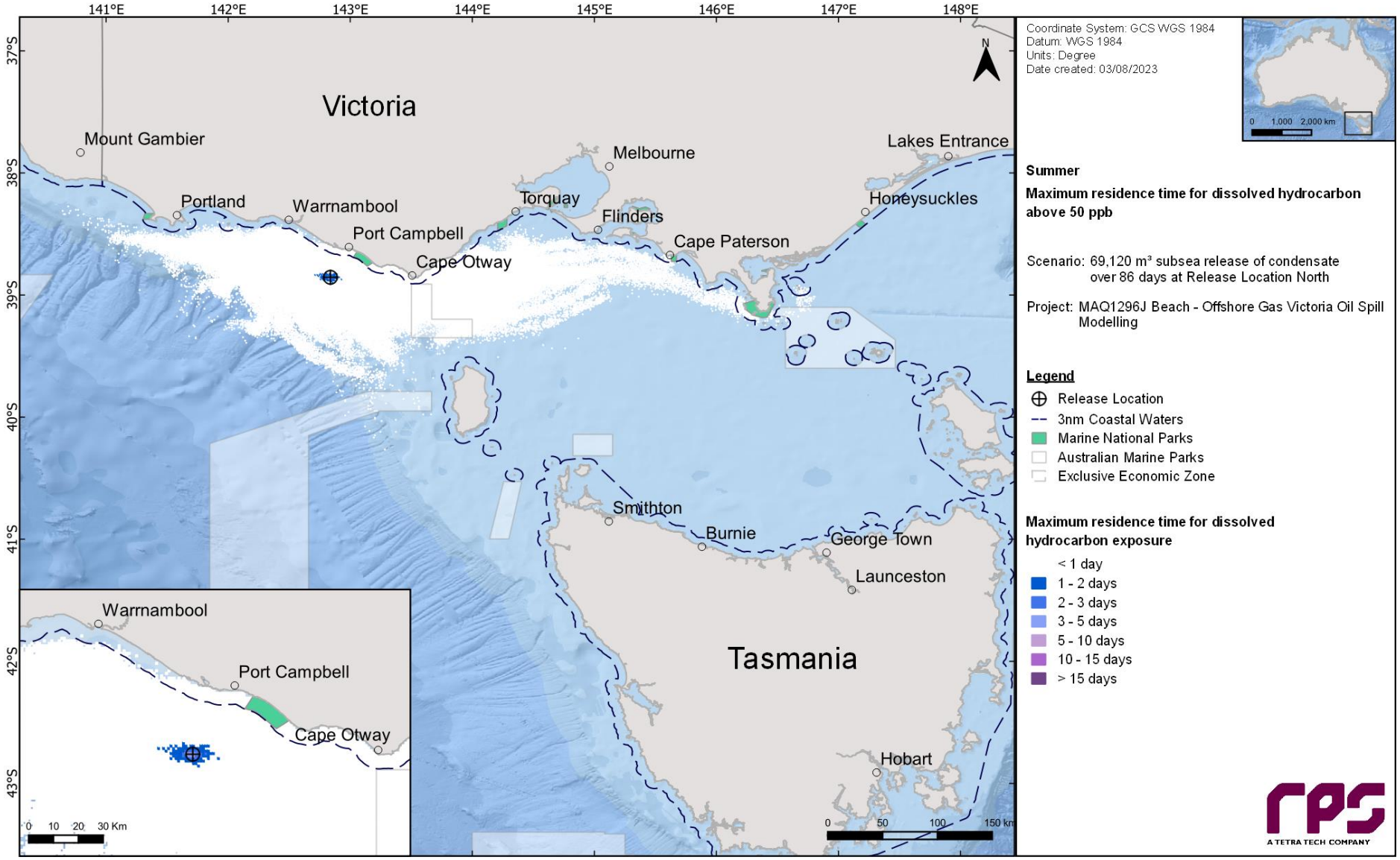

Figure 13.14 Maximum residence time for dissolved hydrocarbon exposure above 50 ppb, at 0-10 m below the sea surface in the event of a 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations during summer conditions.

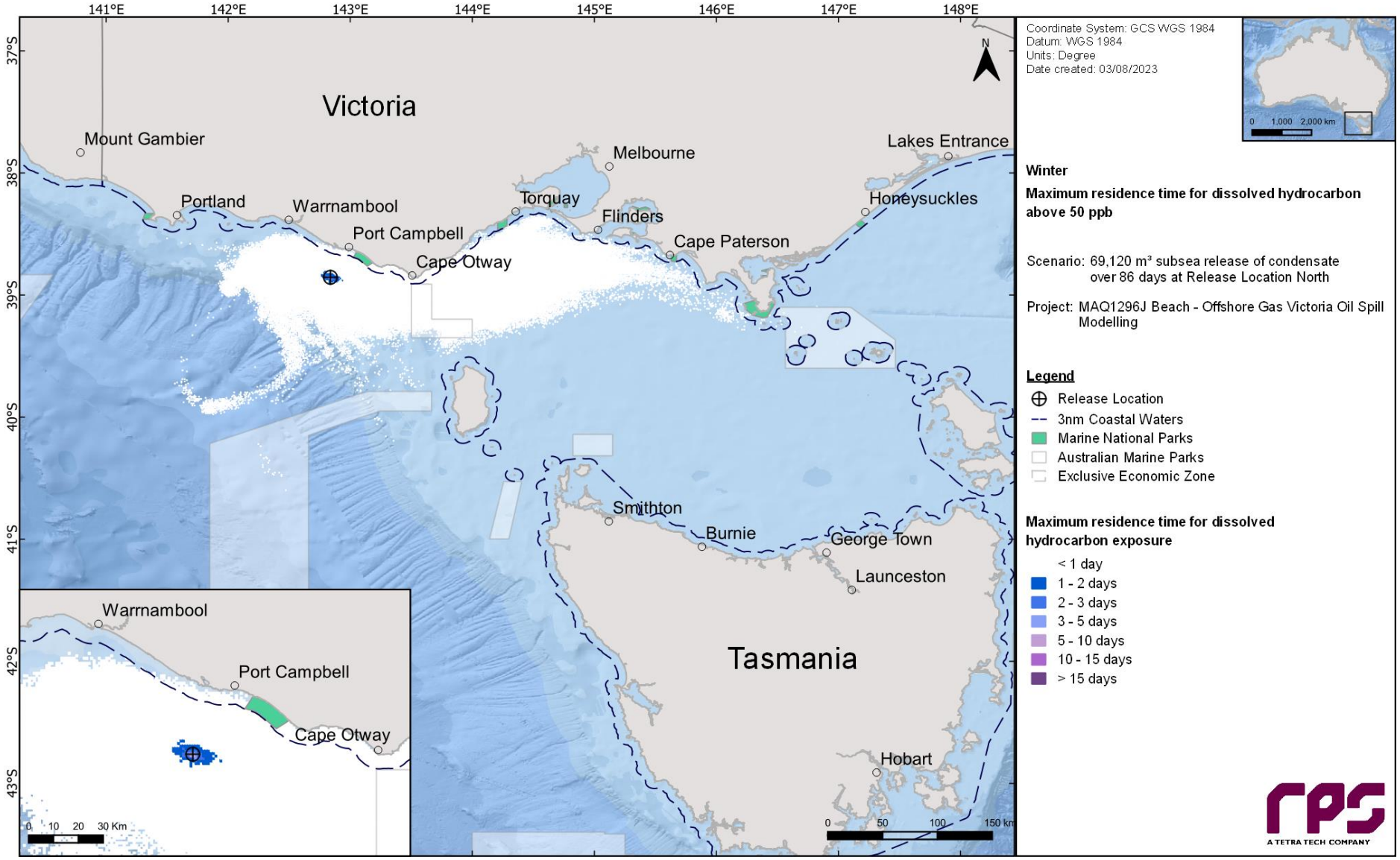

Figure 13.15 Maximum residence time for dissolved hydrocarbon exposure above 50 ppb, at 0-10 m below the sea surface in the event of a 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations during winter conditions.

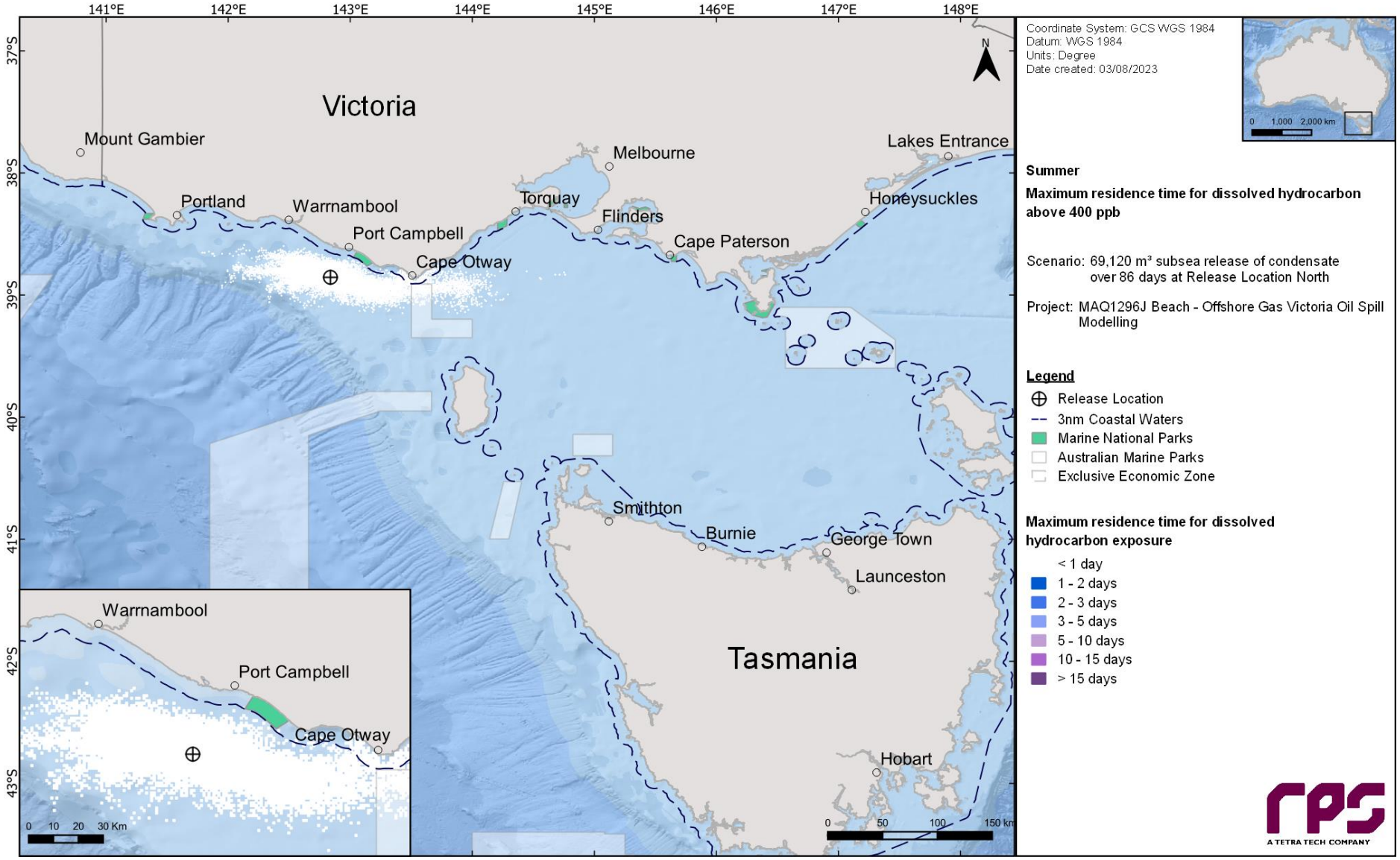

Figure 13.16 Maximum residence time for dissolved hydrocarbon exposure above 400 ppb, at 0-10 m below the sea surface in the event of a 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations during summer conditions.

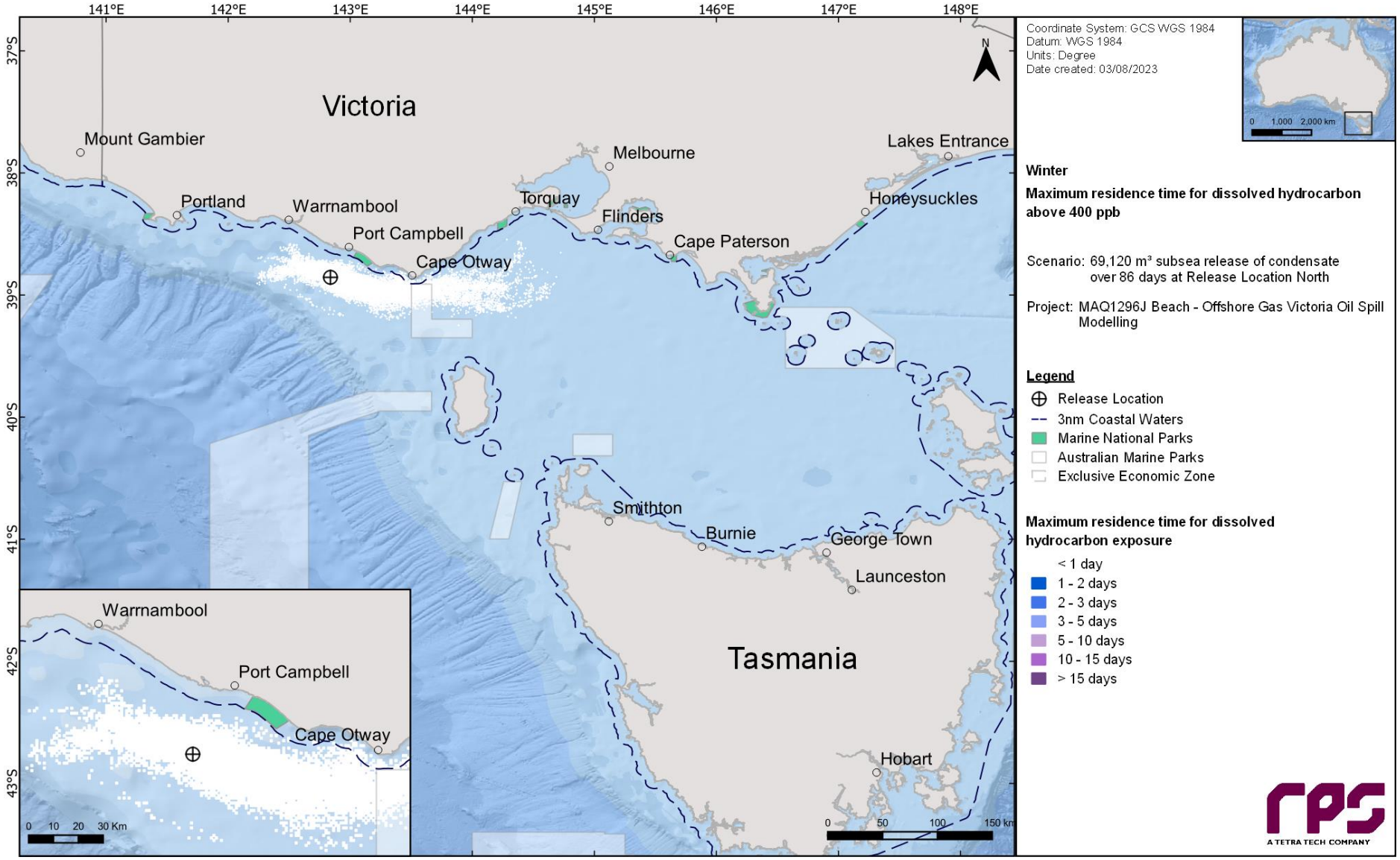

Figure 13.17 Maximum residence time for dissolved hydrocarbon exposure above 400 ppb, at 0-10 m below the sea surface in the event of a 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations during winter conditions.

13.1.4.2 Entrained Hydrocarbons

Table 13-8 presents the probability of exposure to individual receptors from entrained hydrocarbons in the 0-10 m depth layer for the summer and winter conditions.

Outside of the receptors that the Release Location North resides within (refer to Table 10-3), the highest concentration of entrained hydrocarbon was predicted for Pygmy Blue Whale - Foraging (summer – 378 ppb, winter – 332 ppb).

Table 13-9 presents the predicted minimum time to entrained hydrocarbon exposure and maximum residence time for entrained hydrocarbon exposure to individual receptors in the 0-10 m depth layer, for all seasonal conditions and all thresholds assessed.

Figure 13-18 and Figure 13-19 presents the zones of potential entrained hydrocarbon exposure for the 0-10 m depth layer, for each threshold assessed under summer and winter conditions, respectively.

Figure 13-20 to Figure 13-23 present the maximum residence time of entrained hydrocarbon exposure for the NOPSEMA thresholds in summer and winter.

Table 13-8 Probability of entrained hydrocarbons exposure to marine based receptors in the 0–10 m depth layer. Results are based on a 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March)			Winter (April to October)		
		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure	
			Low	High		Low	High
AMP	Apollo	175	96	28	191	100	23
	Beagle	17	4	-	15	6	-
	Zeehan	14	4	-	18	2	-
BIA	Antipodean Albatross - Foraging*	4,243	100	100	4,005	100	100
	Australasian Gannet - Foraging	53	57	-	60	59	-
	Black-browed Albatross - Foraging*	4,243	100	100	4,005	100	100
	Black-faced Cormorant - Foraging	11	2	-	11	1	-
	Bullers Albatross - Foraging*	4,243	100	100	4,005	100	100
	Campbell Albatross – Foraging*	4,243	100	100	4,005	100	100
	Common Diving-petrel – Foraging*	4,243	100	100	4,005	100	100
	Indian Yellow-nosed Albatross – Foraging*	4,243	100	100	4,005	100	100
	Little Penguin - Foraging	13	3	-	23	30	-
	Pygmy Blue Whale – Distribution*	4,243	100	100	4,005	100	100
	Pygmy Blue Whale - Foraging	378	100	90	332	100	100
	Pygmy Blue Whale - Foraging (annual high use area)*	4,243	100	100	4,005	100	100
	Pygmy Blue Whale - Known Foraging Area	189	96	20	187	100	22
	Short-tailed Shearwater - Foraging	444	100	95	413	100	100
	Shy Albatross – Foraging*	4,243	100	100	4,005	100	100
	Southern Right Whale - Aggregation	136	93	9	156	70	9
	Southern Right Whale - Connecting habitat	10	1	-	10	-	-
	Southern Right Whale - Known Core Range*	4,243	100	100	4,005	100	100
	Wandering Albatross – Foraging*	4,243	100	100	4,005	100	100
	Wedge-tailed Shearwater – Foraging*	4,243	100	100	4,005	100	100
	White Shark - Breeding	14	3	-	10	-	-

Receptor		Summer (November through to March)			Winter (April to October)		
		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure	
			Low	High		Low	High
	White Shark – Distribution*	4,243	100	100	4,005	100	100
	White Shark - Foraging	75	60	-	34	55	-
	White-faced Storm-petrel - Foraging	178	96	16	182	100	17
EEZ	Australian*	4,243	100	100	4,005	100	100
IBRA	Bridgewater	11	1	-	8	-	-
	Flinders	10	1	-	10	-	-
	Gippsland Plain	18	3	-	23	12	-
	Glenelg Plain	11	2	-	9	-	-
	King Island	10	1	-	9	-	-
	Otway Plain	205	96	26	260	100	22
	Otway Ranges	138	96	4	127	100	6
	Strzelecki Ranges	10	-	-	22	9	-
	Warrnambool Plain	54	90	-	80	91	-
	Wilsons Promontory	23	4	-	24	13	-
IMCRA	Central Bass Strait	141	95	11	173	100	15
	Central Victoria	178	96	19	182	100	17
	Flinders	24	5	-	24	15	-
	Otway*	4,243	100	100	4,005	100	100
	Twofold Shelf	10	1	-	12	2	-
	Victorian Embayments	15	1	-	19	11	-
KEF	Bonney Coast Upwelling	22	42	-	18	1	-
	West Tasmania Canyons	32	19	-	52	12	-
MNP	Bunurong	8	-	-	12	3	-
	Discovery Bay	12	1	-	7	-	-
	Point Addis	12	1	-	20	11	-
	Port Phillip Heads	14	1	-	8	-	-
	Twelve Apostles	80	97	-	108	85	1
	Wilsons Promontory	23	4	-	24	13	-

Receptor		Summer (November through to March)			Winter (April to October)		
		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure	
			Low	High		Low	High
MS	Mushroom Reef	7	-	-	13	7	-
NPS4	Bunurong Marine Park	8	-	-	11	2	-
	Wilsons Promontory Marine Park	11	1	-	13	2	-
RSB	Bravenes Rock	103	100	4	104	100	1
	Cody Bank	18	3	-	17	14	-
SHORE	Anser Island	21	4	-	23	10	-
	Bass Coast	8	-	-	13	2	-
	Colac Otway	205	96	26	260	100	22
	Corangamite	54	90	-	80	91	-
	Glenelg	11	2	-	9	-	-
	Glennie Group	19	4	-	22	13	-
	Hogan Island Group	10	1	-	10	-	-
	Kanowna Island	23	4	-	23	12	-
	King Island	10	1	-	9	-	-
	Laurence Rocks	10	1	-	8	-	-
	Moncoeur Islands	14	3	-	16	7	-
	Mornington Peninsula	18	1	-	16	9	-
	Moyne	40	67	-	53	30	-
	Norman Island	18	4	-	19	8	-
	Phillip Island	10	-	-	23	12	-
	Rodondo Island	14	3	-	18	9	-
	Seal Islands	12	3	-	6	-	-
	Shellback Island	11	2	-	13	2	-
	Skull Rock	23	4	-	21	13	-
	South Gippsland	19	3	-	24	10	-
	Surf Coast	17	9	-	25	34	-
	Warrnambool	8	-	-	13	1	-
State Waters	Tasmania	10	1	-	11	2	-

Receptor		Summer (November through to March)			Winter (April to October)		
		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure	
			Low	High		Low	High
	Victoria	234	100	33	260	100	40
Sub-LGA	Anglesea	10	2	-	19	10	-
	Apollo Bay	138	93	4	113	100	3
	Bay of Islands	40	67	-	53	30	-
	Cape Liptrap	9	-	-	22	10	-
	Cape Nelson	11	2	-	9	-	-
	Cape Otway West	205	96	26	260	100	23
	Cape Patton	82	49	-	60	76	-
	Childers Cove	15	4	-	22	11	-
	Kilcunda	7	-	-	11	1	-
	Lorne	19	11	-	26	37	-
	Moonlight Head	54	90	-	80	91	-
	Mornington Peninsula (S)	9	-	-	15	7	-
	Mornington Peninsula (SW)	18	1	-	16	9	-
	Port Campbell	35	65	-	49	38	-
	Port Phillip (Sorrento Shore)	16	1	-	9	-	-
	Torquay	6	-	-	10	1	-
	Venus Bay	8	-	-	13	2	-
	Waratah Bay	10	-	-	22	9	-
	Westernport	7	-	-	12	6	-
	Wilsons Promontory (East)	13	3	-	17	6	-
	Wilsons Promontory (West)	19	3	-	24	8	-

*The release location resides within the receptor boundaries.

Table 13-9 Predicted minimum time to entrained hydrocarbon exposure and maximum residence time for entrained hydrocarbon exposure to individual receptors in the 0-10 m depth layer. Results are based on a 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill trajectories per season.

Receptor		Summer (November through to March)				Winter (April to October)			
		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)	
		Low	High	Low	High	Low	High	Low	High
AMP	Apollo	2	3	20	1	1	2	20	< 1
	Beagle	55	-	2	-	34	-	< 1	-
	Zeehan	24	-	< 1	-	15	-	1	-
BIA	Antipodean Albatross - Foraging*	< 1	< 1	65	22	< 1	< 1	67	18
	Australasian Gannet - Foraging	5	-	12	-	5	-	9	-
	Black-browed Albatross - Foraging*	< 1	< 1	65	22	< 1	< 1	67	18
	Black-faced Cormorant - Foraging	45	-	< 1	-	23	-	< 1	-
	Bullers Albatross - Foraging*	< 1	< 1	65	22	< 1	< 1	67	18
	Campbell Albatross – Foraging*	< 1	< 1	65	22	< 1	< 1	67	18
	Common Diving-petrel – Foraging*	< 1	< 1	65	22	< 1	< 1	67	18
	Indian Yellow-nosed Albatross – Foraging*	< 1	< 1	65	22	< 1	< 1	67	18
	Little Penguin - Foraging	45	-	< 1	-	8	-	5	-
	Pygmy Blue Whale – Distribution*	< 1	< 1	65	22	< 1	< 1	67	18
	Pygmy Blue Whale - Foraging	< 1	1	46	3	< 1	1	67	5
	Pygmy Blue Whale - Foraging (annual high use area)*	< 1	< 1	65	22	< 1	< 1	67	18
	Pygmy Blue Whale - Known Foraging Area	3	3	34	1	1	3	36	1
	Short-tailed Shearwater - Foraging	< 1	< 1	46	3	< 1	1	67	5
	Shy Albatross – Foraging*	< 1	< 1	65	22	< 1	< 1	67	18
	Southern Right Whale - Aggregation	1	2	31	1	1	5	22	1
	Southern Right Whale - Connecting habitat	48	-	< 1	-	-	-	-	-
	Southern Right Whale - Known Core Range*	< 1	< 1	65	22	< 1	< 1	67	18
	Wandering Albatross – Foraging*	< 1	< 1	65	22	< 1	< 1	67	18
	Wedge-tailed Shearwater – Foraging*	< 1	< 1	65	22	< 1	< 1	67	18
	White Shark - Breeding	55	-	< 1	-	-	-	-	-

Receptor		Summer (November through to March)				Winter (April to October)			
		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)	
		Low	High	Low	High	Low	High	Low	High
	White Shark – Distribution*	< 1	< 1	65	22	< 1	< 1	67	18
	White Shark - Foraging	3	-	13	-	7	-	11	-
	White-faced Storm-petrel - Foraging	3	3	34	1	1	3	36	1
EEZ	Australian*	< 1	< 1	65	22	< 1	< 1	67	18
IBRA	Bridgewater	45	-	< 1	-	-	-	-	-
	Flinders	59	-	< 1	-	-	-	-	-
	Gippsland Plain	56	-	1	-	11	-	6	-
	Glenelg Plain	29	-	< 1	-	-	-	-	-
	King Island	48	-	< 1	-	-	-	-	-
	Otway Plain	4	7	45	2	1	5	40	5
	Otway Ranges	4	18	29	1	2	15	35	< 1
	Strzelecki Ranges	-	-	-	-	15	-	5	-
	Warrnambool Plain	4	-	14	-	2	-	22	-
	Wilsons Promontory	54	-	5	-	16	-	9	-
IMCRA	Central Bass Strait	3	3	19	< 1	2	3	17	< 1
	Central Victoria	3	3	34	1	1	3	36	1
	Flinders	53	-	5	-	10	-	11	-
	Otway*	< 1	< 1	65	22	< 1	< 1	67	18
	Twofold Shelf	59	-	< 1	-	35	-	< 1	-
	Victorian Embayments	99	-	< 1	-	17	-	5	-
KEF	Bonney Coast Upwelling	10	-	2	-	80	-	3	-
	West Tasmania Canyons	7	-	3	-	12	-	2	-
MNP	Bunurong	-	-	-	-	17	-	< 1	-
	Discovery Bay	45	-	< 1	-	-	-	-	-
	Point Addis	43	-	< 1	-	15	-	2	-
	Port Phillip Heads	98	-	< 1	-	-	-	-	-
	Twelve Apostles	4	-	26	-	2	9	23	< 1
	Wilsons Promontory	54	-	5	-	16	-	11	-

Receptor		Summer (November through to March)				Winter (April to October)			
		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)	
		Low	High	Low	High	Low	High	Low	High
MS	Mushroom Reef	-	-	-	-	28	-	< 1	-
NPS4	Bunurong Marine Park	-	-	-	-	54	-	< 1	-
	Wilsons Promontory Marine Park	56	-	< 1	-	54	-	< 1	-
RSB	Bravenes Rock	3	15	16	< 1	2	10	20	< 1
	Cody Bank	53	-	1	-	8	-	1	-
SHORE	Anser Island	54	-	5	-	17	-	8	-
	Bass Coast	-	-	-	-	54	-	< 1	-
	Colac Otway	4	7	45	2	1	5	40	5
	Corangamite	4	-	18	-	2	-	22	-
	Glenelg	29	-	< 1	-	-	-	-	-
	Glennie Group	54	-	5	-	16	-	9	-
	Hogan Island Group	59	-	< 1	-	-	-	-	-
	Kanowna Island	54	-	5	-	17	-	7	-
	King Island	48	-	< 1	-	-	-	-	-
	Laurence Rocks	33	-	< 1	-	-	-	-	-
	Moncoeur Islands	55	-	< 1	-	34	-	1	-
	Mornington Peninsula	97	-	1	-	11	-	1	-
	Moyne	12	-	9	-	2	-	10	-
	Norman Island	55	-	1	-	16	-	4	-
	Phillip Island	-	-	-	-	17	-	5	-
	Rodondo Island	55	-	< 1	-	27	-	1	-
	Seal Islands	56	-	< 1	-	-	-	-	-
	Shellback Island	56	-	< 1	-	53	-	< 1	-
	Skull Rock	54	-	5	-	18	-	8	-
	South Gippsland	55	-	3	-	15	-	7	-
	Surf Coast	33	-	10	-	15	-	10	-
	Warrnambool	-	-	-	-	9	-	< 1	-
	Tasmania	45	-	< 1	-	23	-	< 1	-

Receptor		Summer (November through to March)				Winter (April to October)			
		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)	
		Low	High	Low	High	Low	High	Low	High
State Waters	Victoria	3	5	46	3	1	2	59	5
Sub-LGA	Anglesea	99	-	< 1	-	23	-	5	-
	Apollo Bay	4	18	25	1	2	15	27	< 1
	Bay of Islands	12	-	9	-	3	-	10	-
	Cape Liptrap	-	-	-	-	15	-	6	-
	Cape Nelson	29	-	< 1	-	-	-	-	-
	Cape Otway West	4	7	44	2	1	5	40	5
	Cape Patton	7	-	29	-	6	-	17	-
	Childers Cove	62	-	1	-	3	-	3	-
	Kilcunda	-	-	-	-	55	-	< 1	-
	Lorne	30	-	10	-	21	-	10	-
	Moonlight Head	4	-	18	-	2	-	22	-
	Mornington Peninsula (S)	-	-	-	-	11	-	1	-
	Mornington Peninsula (SW)	98	-	< 1	-	11	-	1	-
	Port Campbell	10	-	11	-	3	-	17	-
	Port Phillip (Sorrento Shore)	97	-	1	-	-	-	-	-
	Torquay	-	-	-	-	36	-	< 1	-
	Venus Bay	-	-	-	-	54	-	< 1	-
	Waratah Bay	-	-	-	-	15	-	5	-
	Westernport	-	-	-	-	28	-	< 1	-
	Wilsons Promontory (East)	55	-	< 1	-	40	-	4	-
	Wilsons Promontory (West)	55	-	3	-	18	-	7	-

*The release location resides within the receptor boundaries.

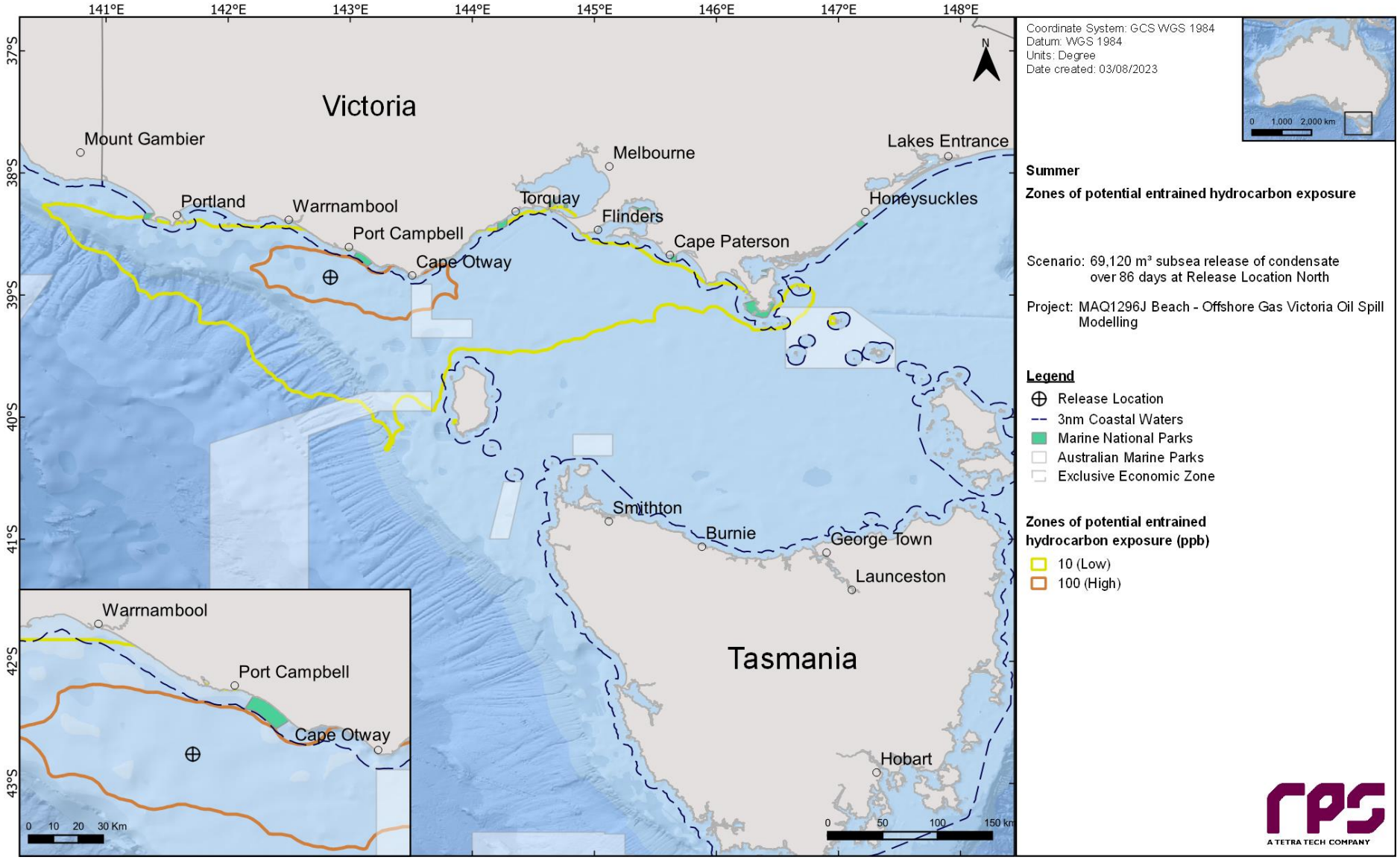

Figure 13-18 Zones of potential entrained hydrocarbon exposure at 0-10 m below the sea surface in the event of a 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations during summer conditions.

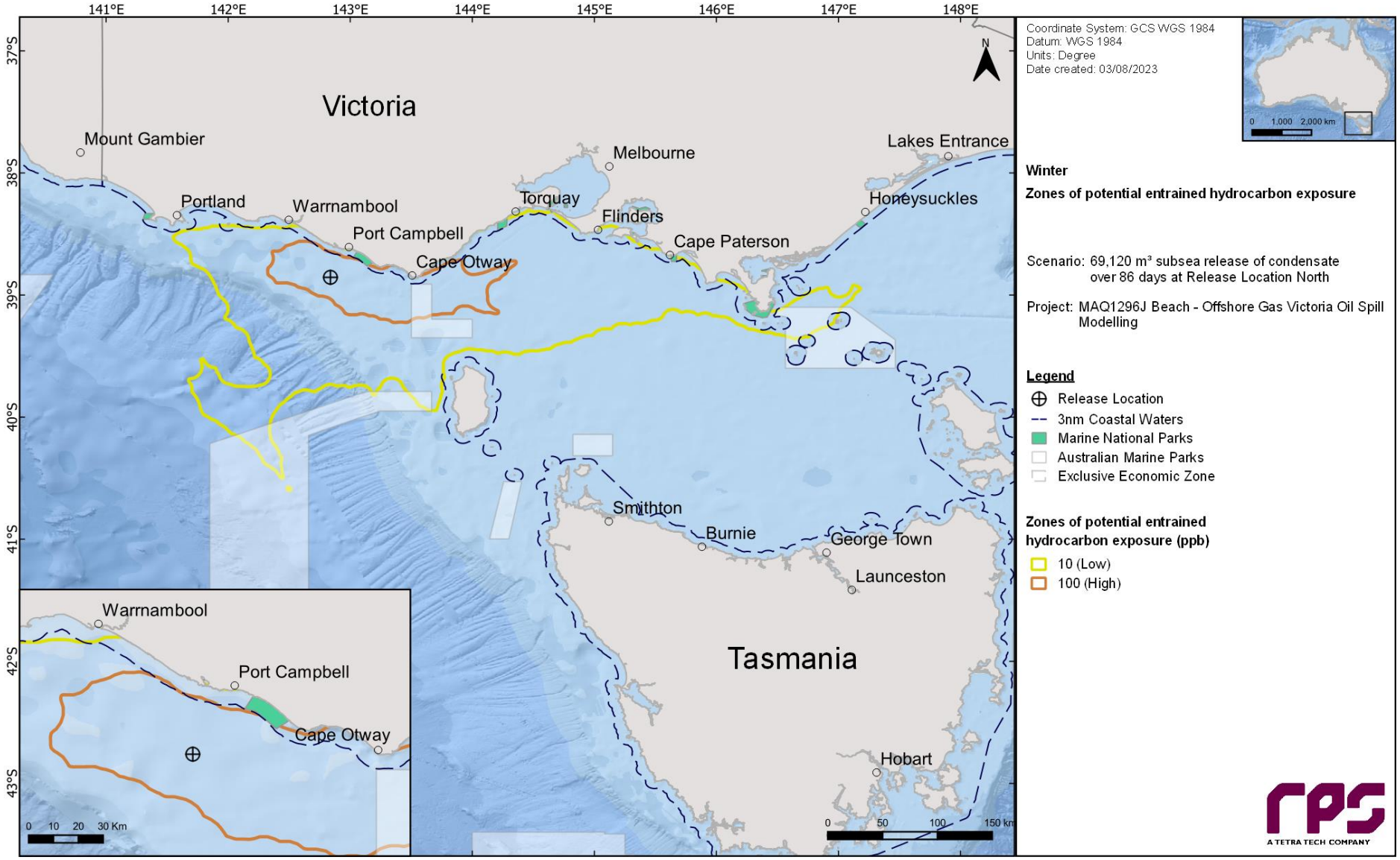

Figure 13-19 Zones of potential entrained hydrocarbon exposure at 0-10 m below the sea surface in the event of a 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations during winter conditions.

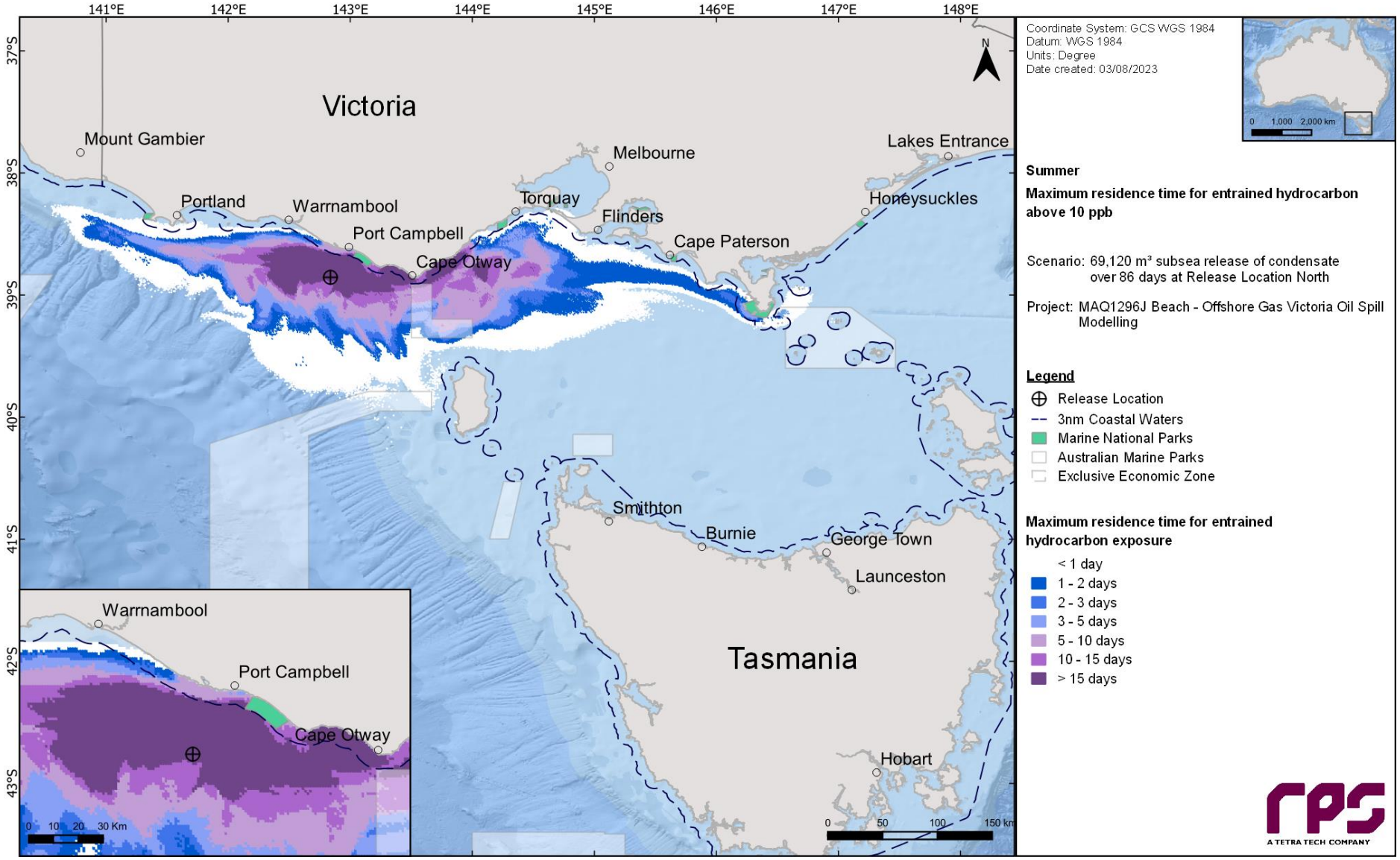

Figure 13-20 Maximum residence time for entrained hydrocarbon exposure above 10 ppb, at 0-10 m below the sea surface in the event of a 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations during summer conditions.

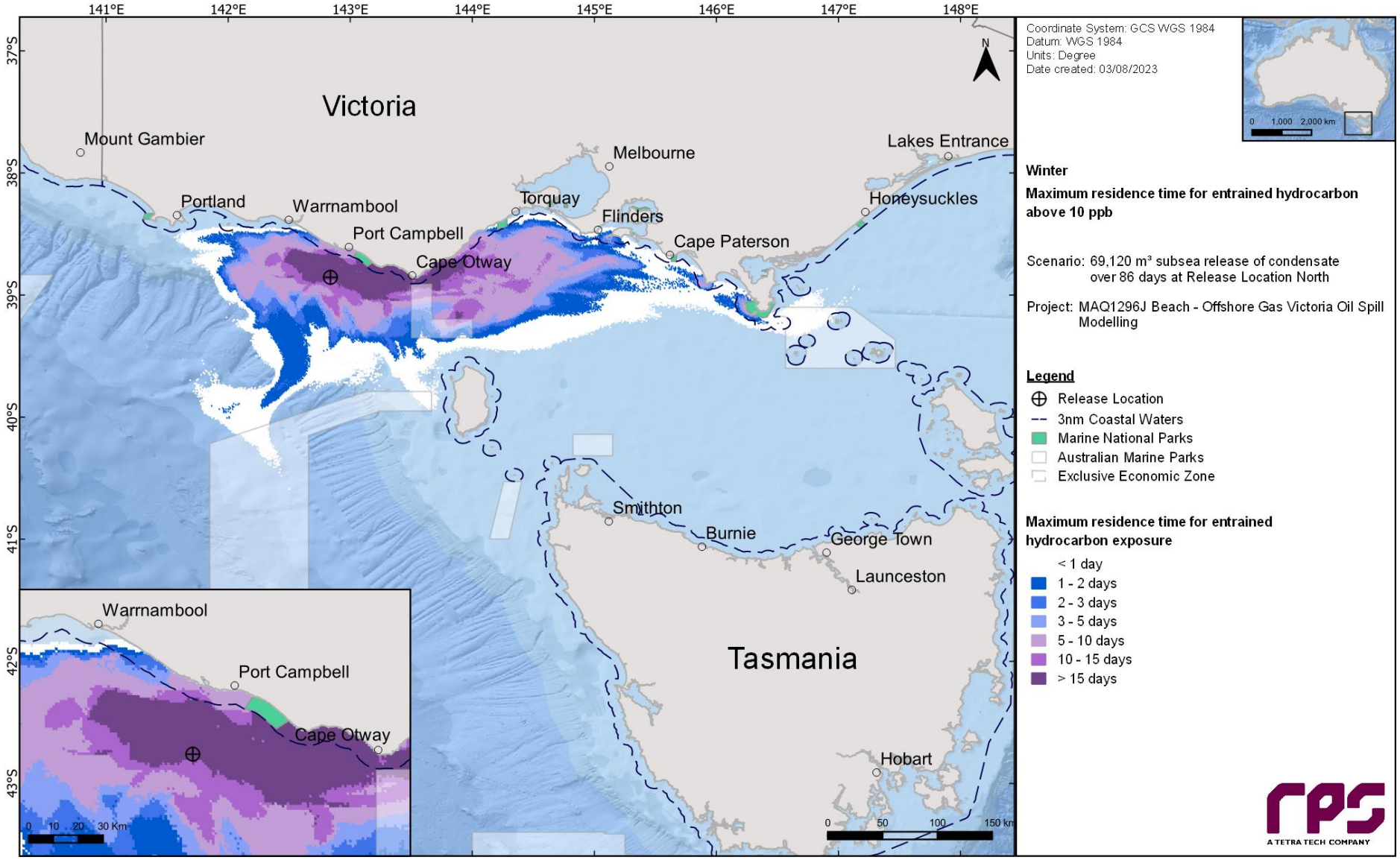

Figure 13-21 Maximum residence time for entrained hydrocarbon exposure above 10 ppb, at 0-10 m below the sea surface in the event of a 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations during winter conditions.

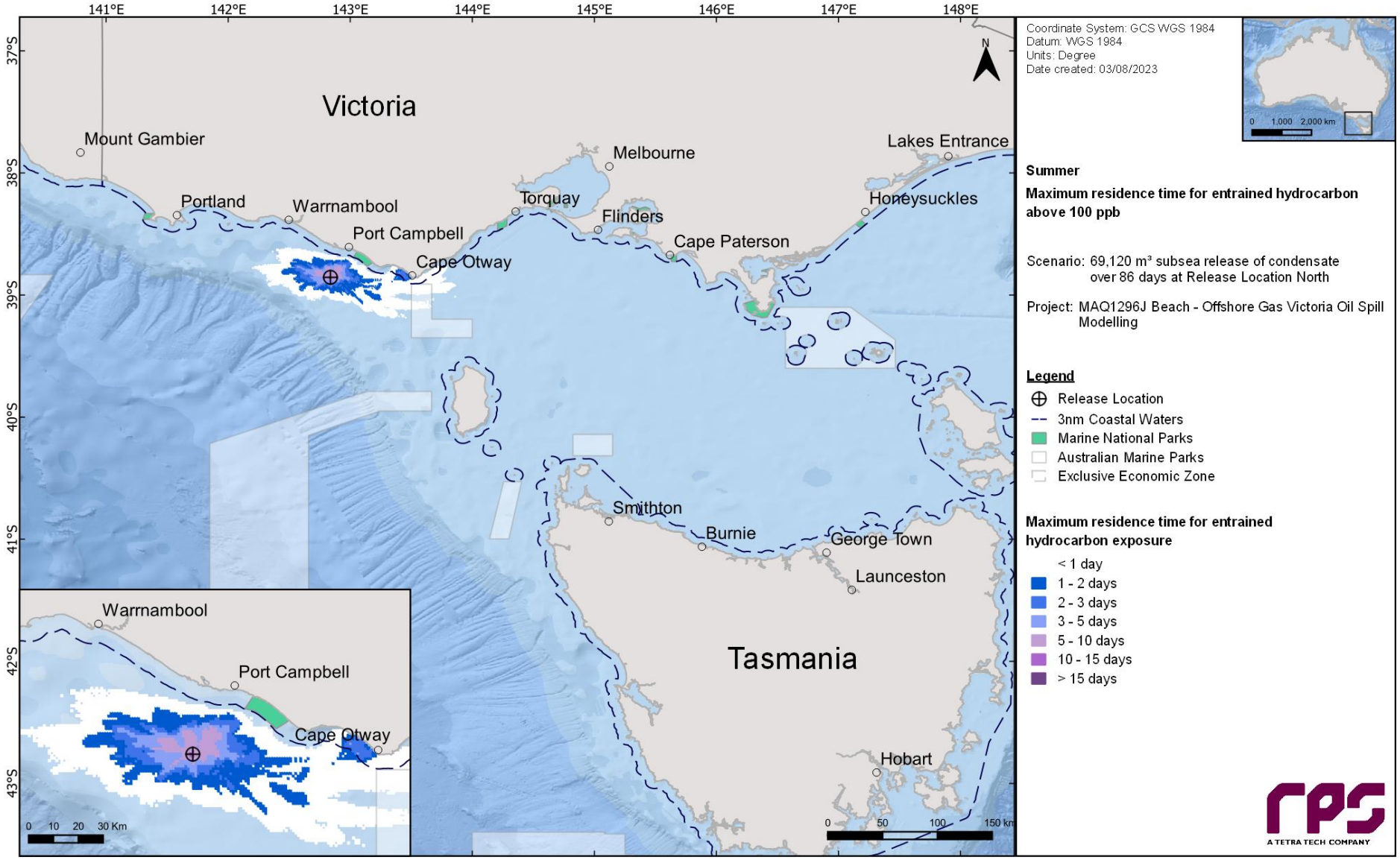

Figure 13-22 Maximum residence time for entrained hydrocarbon exposure above 100 ppb, at 0-10 m below the sea surface in the event of a 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations during summer conditions.

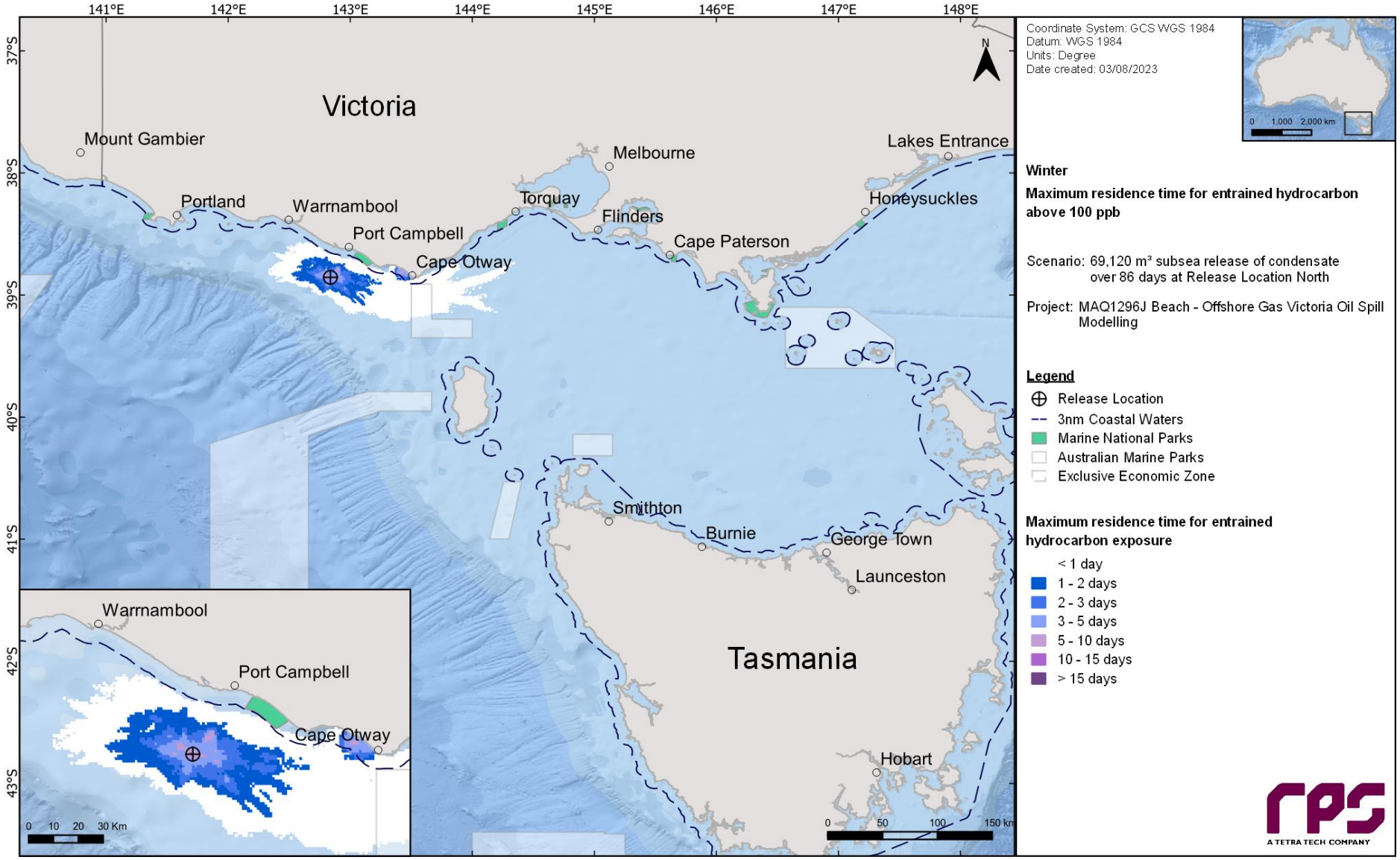

Figure 13-23 Maximum residence time for entrained hydrocarbon exposure above 100 ppb, at 0-10 m below the sea surface in the event of a 69,120.0 m³ subsea release of condensate over 86 days from a loss of well control at the Release Location North. The results were calculated from 100 spill simulations during winter conditions.

14 RESULTS – LOSS OF CONTAINMENT FROM VESSEL COLLISION AT THE RELEASE LOCATION NORTH FIELD

This scenario examined a 603.7 m^3 surface release of marine diesel for a loss of containment from a vessel collision at the Release Location North field. A total of 200 spill simulations were run (i.e., 100 spills per season) and tracked for 30 days. The results for all 100 simulations per season were combined and are presented on a seasonal basis (i.e., summer and winter).

14.1 Stochastic Analysis

14.1.1 Area of Exposure

Figure 14-1 presents the combined area of potential exposure for surface, shoreline, entrained and dissolved, by overlaying the results from all 200 simulations (i.e., 100 per season) during summer and winter conditions.

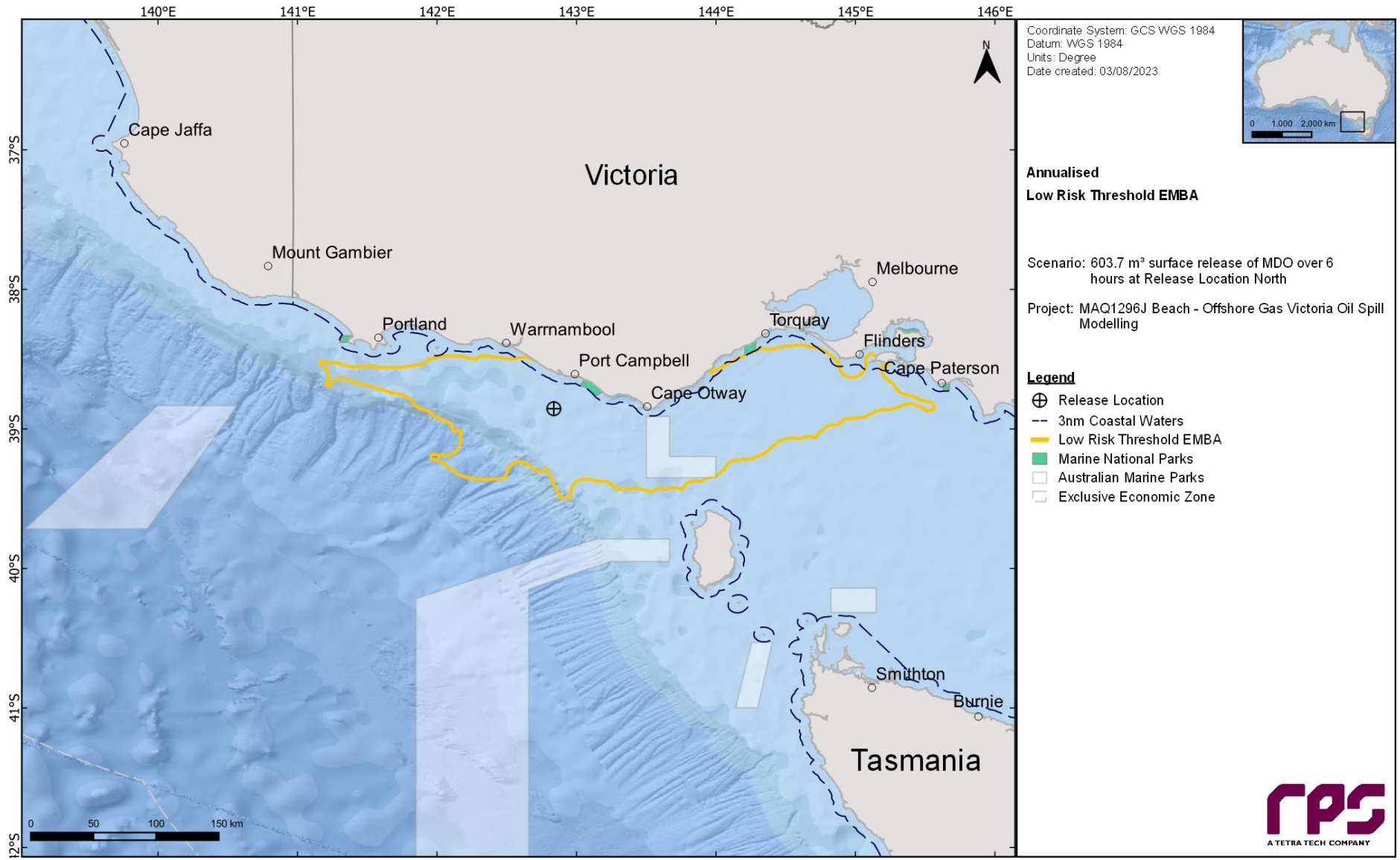

Figure 14-1 Predicted area of exposure for low thresholds produced by overlaying the results from all 200 simulations, resulting from a 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field during summer and winter conditions.

14.1.2 Floating Oil Exposure

Table 14-1 summarises the maximum distance travelled by floating oil on the sea surface at each threshold. The maximum distance from the release location to the low (1–10 g/m^2), moderate (10–50 g/m^2) and high (> 50 g/m^2) exposure zones was 54 km (east) during winter conditions, 19 km (south-southeast) during winter conditions and 10 km (north-northwest in summer and east in winter).

Table 14-2 summarises the potential floating oil exposure to individual receptors during the summer and winter conditions. Outside of the receptors that the Release Location North resides within (refer to Table 10-3), floating oil exposure above the low threshold was predicted at the Pygmy Blue Whale – Foraging (1% summer, 3% winter) and Short-tailed Shearwater - Foraging (3% summer, 4% winter) BIAs.

Table 14-3 presents the maximum residence time of floating oil exposure for each individual grid cell within each individual receptor during summer and winter.

Figure 14-2 and Figure 14-3 present the zones of potential floating oil exposure for all thresholds under summer and winter conditions, respectively.

Figure 14-4 to Figure 14-9 present the maximum residence time of floating oil exposure for the NOPSEMA thresholds during summer and winter, respectively.

Table 14-1 Maximum distance and direction from the release location to the edge of floating oil exposure. Results are based on a 603.7 m^3 surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations per season.

Season	Distance and direction travelled	Zones of potential floating oil exposure		
		Low	Moderate	High
Summer	Maximum distance (km) from release location	45	17	10
	Maximum distance (km) from release location (99th percentile)	23	16	10
	Direction	E	NW	NNW
Winter	Maximum distance (km) from release location	54	19	9
	Maximum distance (km) from release location (99th percentile)	30	18	9
	Direction	E	SSE	E

Table 14-2 Summary of the potential floating oil exposure to individual receptors. Results are based on a 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March)						Winter (April to October)					
		Probability of floating oil exposure (%)			Minimum time before floating oil exposure (days)			Probability of floating oil exposure (%)			Minimum time before floating oil exposure (days)		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
BIA	Antipodean Albatross - Foraging*	100	100	76	1	1	1	100	100	69	1	1	1
	Black-browed Albatross - Foraging*	100	100	76	1	1	1	100	100	69	1	1	1
	Bullers Albatross - Foraging*	100	100	76	1	1	1	100	100	69	1	1	1
	Campbell Albatross – Foraging*	100	100	76	1	1	1	100	100	69	1	1	1
	Common Diving-petrel – Foraging*	100	100	76	1	1	1	100	100	69	1	1	1
	Indian Yellow-nosed Albatross – Foraging*	100	100	76	1	1	1	100	100	69	1	1	1
	Pygmy Blue Whale – Distribution*	100	100	76	1	1	1	100	100	69	1	1	1
	Pygmy Blue Whale - Foraging	1	-	-	40	-	-	3	-	-	46	-	-
	Pygmy Blue Whale - Foraging (annual high use area)*	100	100	76	1	1	1	100	100	69	1	1	1
	Short-tailed Shearwater - Foraging	3	-	-	16	-	-	4	-	-	45	-	-
	Shy Albatross – Foraging*	100	100	76	1	1	1	100	100	69	1	1	1
	Southern Right Whale - Known Core Range*	100	100	76	1	1	1	100	100	69	1	1	1
	Wandering Albatross – Foraging*	100	100	76	1	1	1	100	100	69	1	1	1
	Wedge-tailed Shearwater – Foraging*	100	100	76	1	1	1	100	100	69	1	1	1
	White Shark – Distribution*	100	100	76	1	1	1	100	100	69	1	1	1
EEZ	Australian*	100	100	76	1	1	1	100	100	69	1	1	1
IMCRA	Otway*	100	100	76	1	1	1	100	100	69	1	1	1
State Waters	Victoria State Waters	-	-	-	-	-	-	1	-	-	60	-	-

*The release location resides within the receptor boundaries.

Table 14-3 Summary of the maximum residence time of floating oil exposure for each individual grid cell within each individual receptor. Results are based on a 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March) Maximum residence time of floating oil exposure (days)			Winter (April to October) Maximum residence time of floating oil exposure (days)		
		Low	Moderate	High	Low	Moderate	High
BIA	Antipodean Albatross - Foraging*	1	1	1	2	1	< 1
	Black-browed Albatross - Foraging*	1	1	1	2	1	< 1
	Bullers Albatross - Foraging*	1	1	1	2	1	< 1
	Campbell Albatross – Foraging*	1	1	1	2	1	< 1
	Common Diving-petrel – Foraging*	1	1	1	2	1	< 1
	Indian Yellow-nosed Albatross – Foraging*	1	1	1	2	1	< 1
	Pygmy Blue Whale – Distribution*	1	1	1	2	1	< 1
	Pygmy Blue Whale - Foraging	-	-	-	< 1	-	-
	Pygmy Blue Whale - Foraging (annual high use area)*	1	1	1	2	1	< 1
	Short-tailed Shearwater - Foraging	< 1	-	-	< 1	-	-
	Shy Albatross – Foraging*	1	1	1	2	1	< 1
	Southern Right Whale - Known Core Range*	1	1	1	2	1	< 1
	Wandering Albatross – Foraging*	1	1	1	2	1	< 1
	Wedge-tailed Shearwater – Foraging*	1	1	1	2	1	< 1
	White Shark – Distribution*	1	1	1	2	1	< 1
EEZ	Australian*	1	1	1	2	1	< 1
IMCRA	Otway*	1	1	1	2	1	< 1
State Waters	Victoria State Waters	-	-	-	< 1	-	-

*The release location resides within the receptor boundaries.

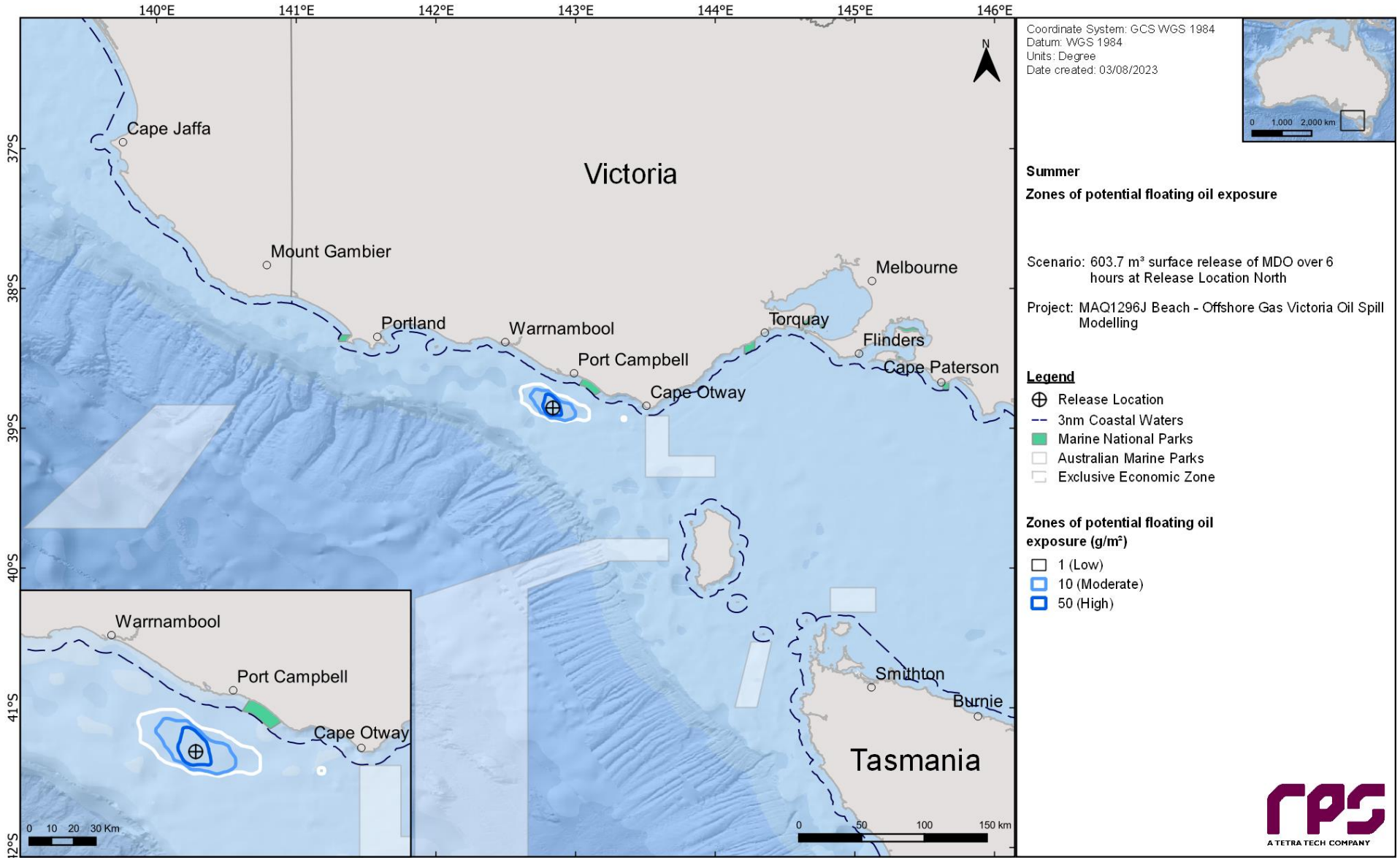

Figure 14-2 **Zones of potential floating oil exposure in the event of a 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations during summer conditions.**

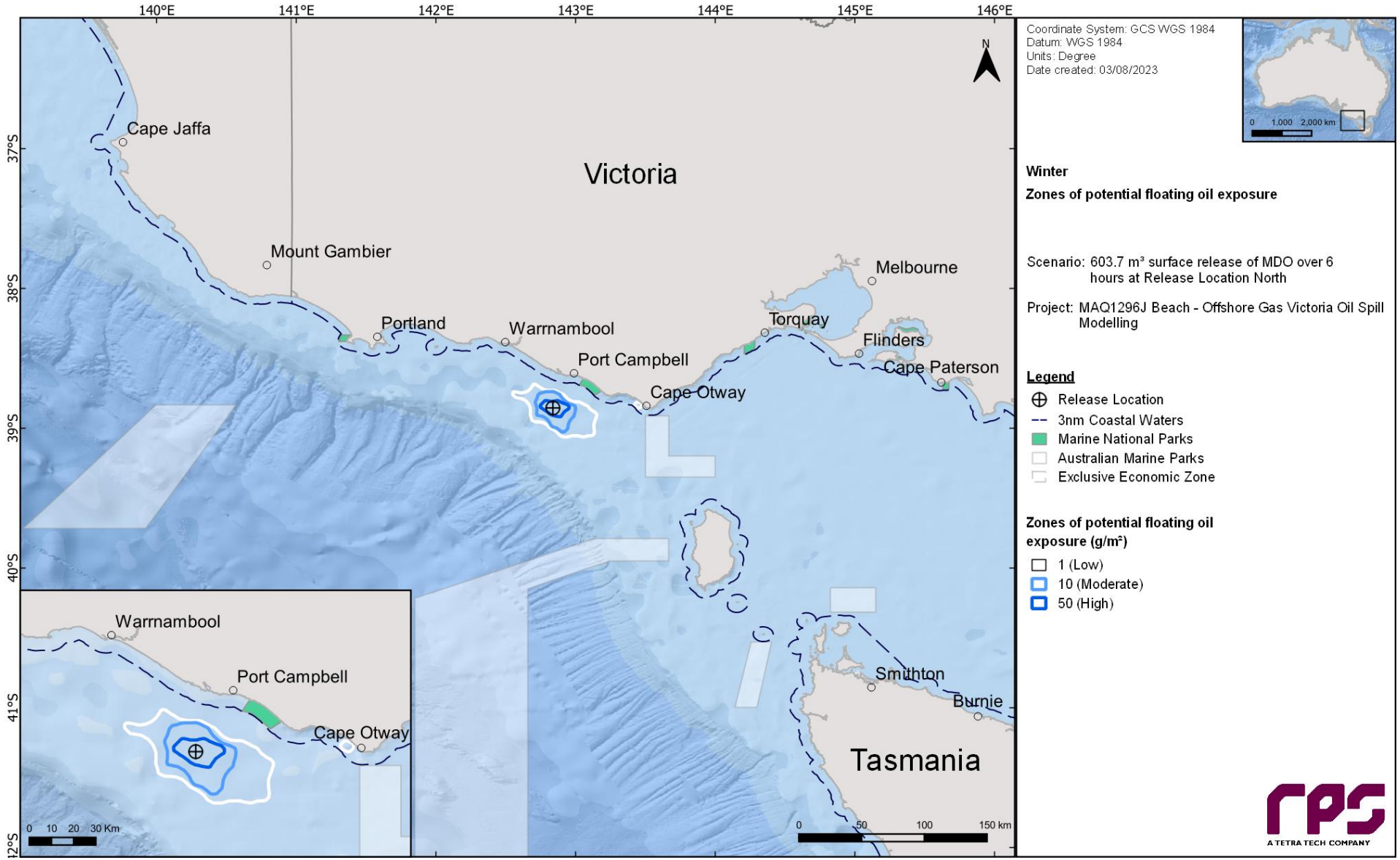

Figure 14-3 **Zones of potential floating oil exposure in the event of a 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations during winter conditions.**

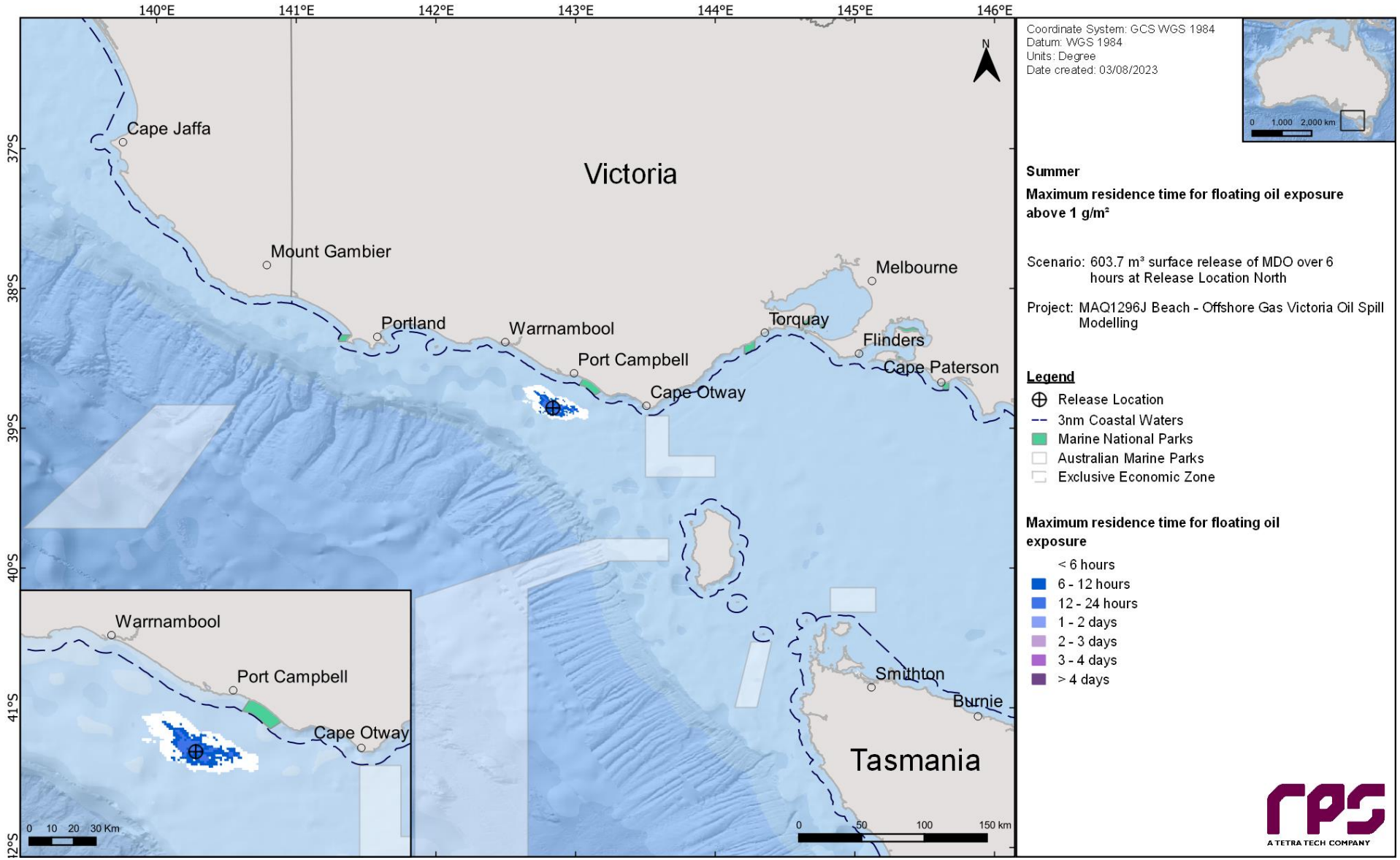

Figure 14-4 Maximum residence time of floating oil exposure above 1 g/m², in the event of 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations during summer conditions.

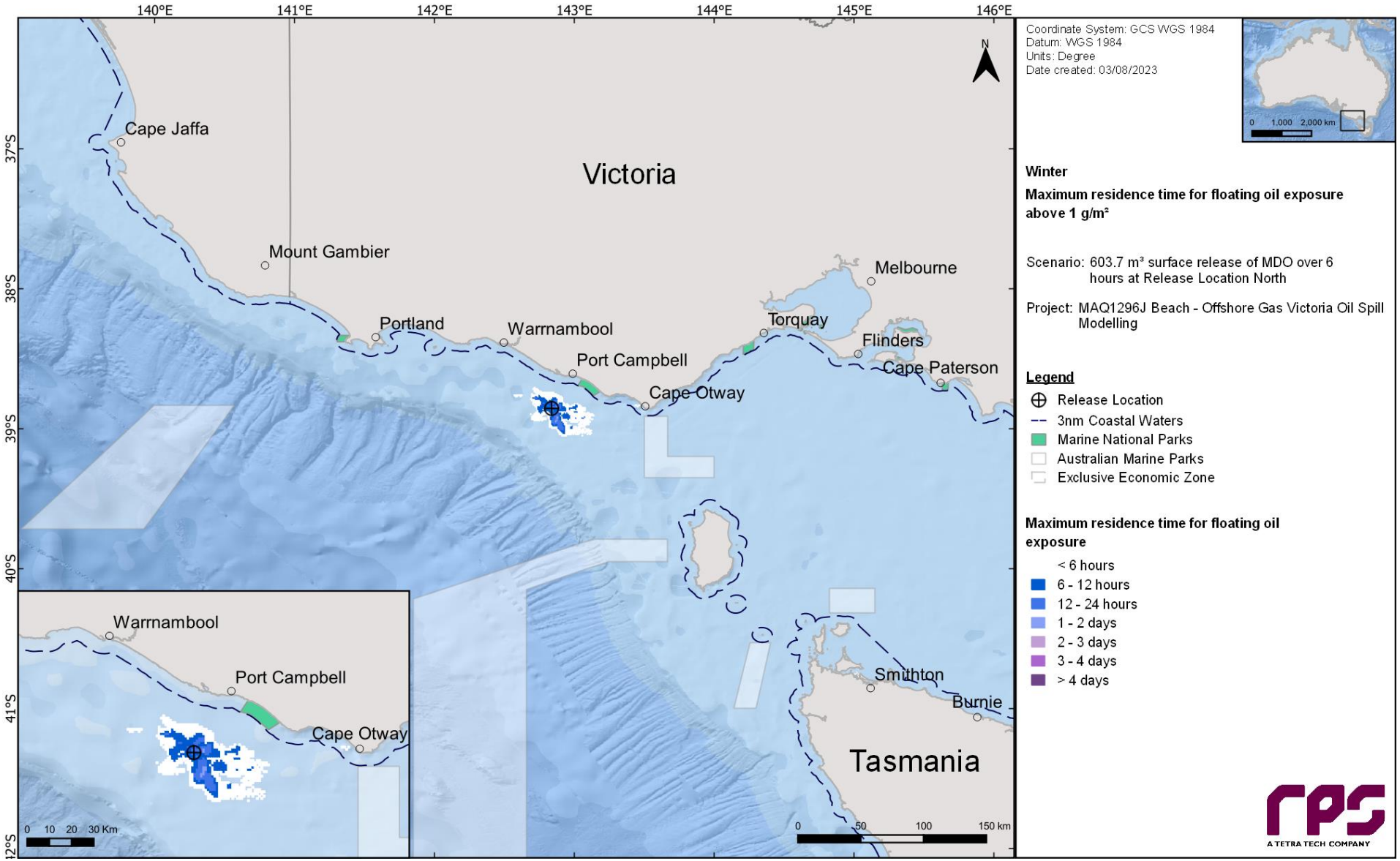

Figure 14-5 Maximum residence time of floating oil exposure above 1 g/m², in the event of 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations during winter conditions.

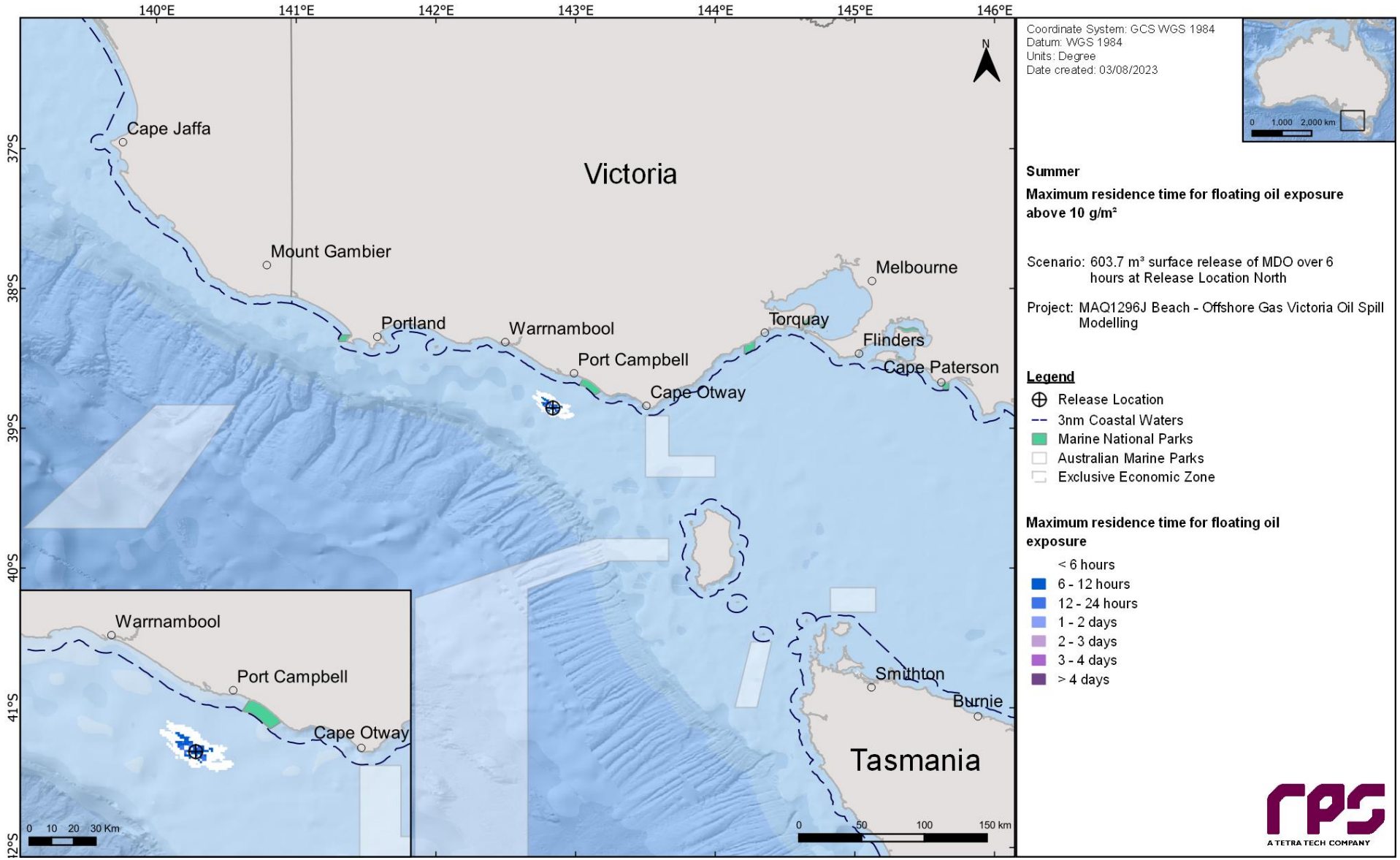

Figure 14-6 Maximum residence time of floating oil exposure above 10 g/m², in the event of 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations during summer conditions.

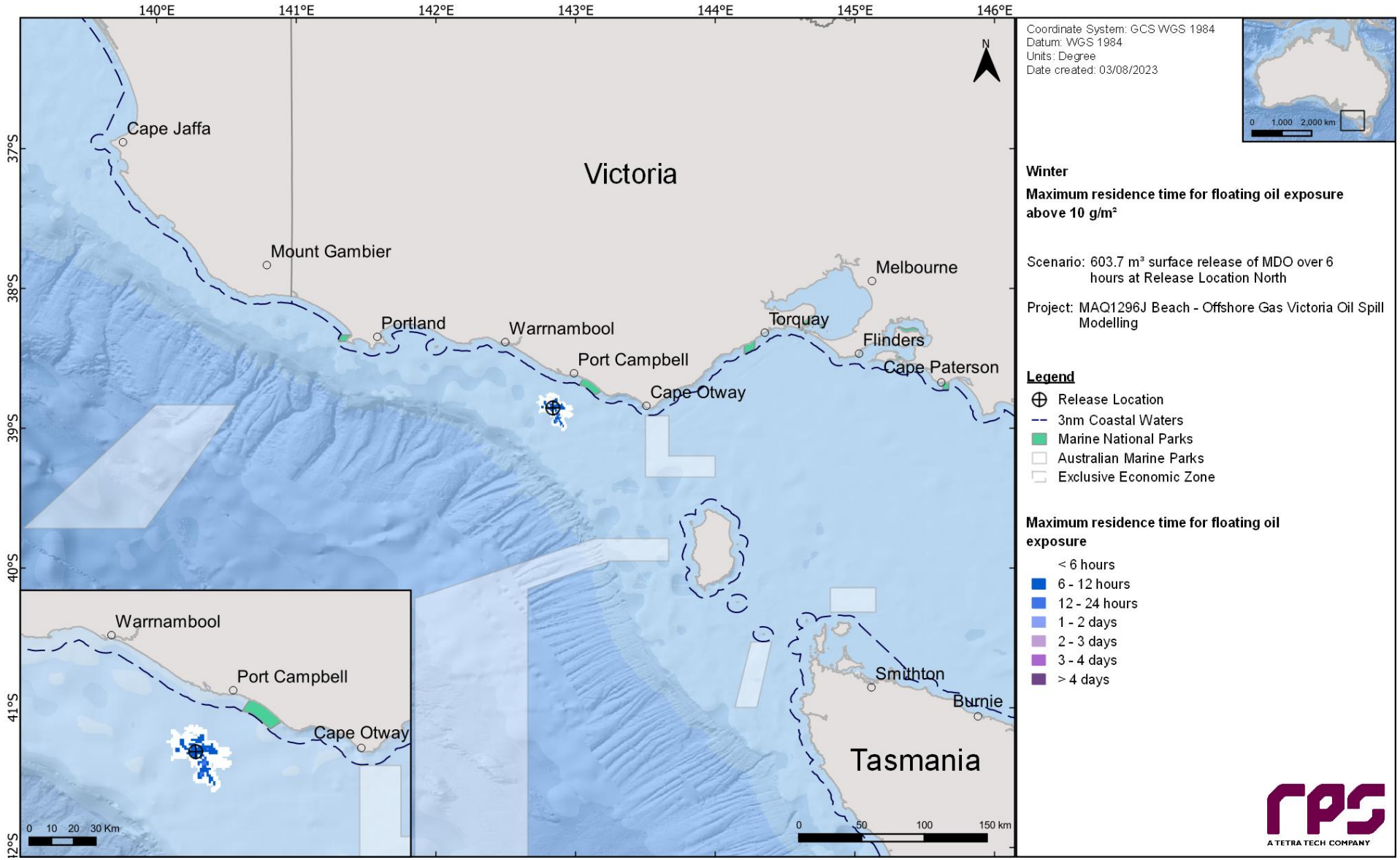

Figure 14-7 Maximum residence time of floating oil exposure above 10 g/m², in the event of 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations during winter conditions.

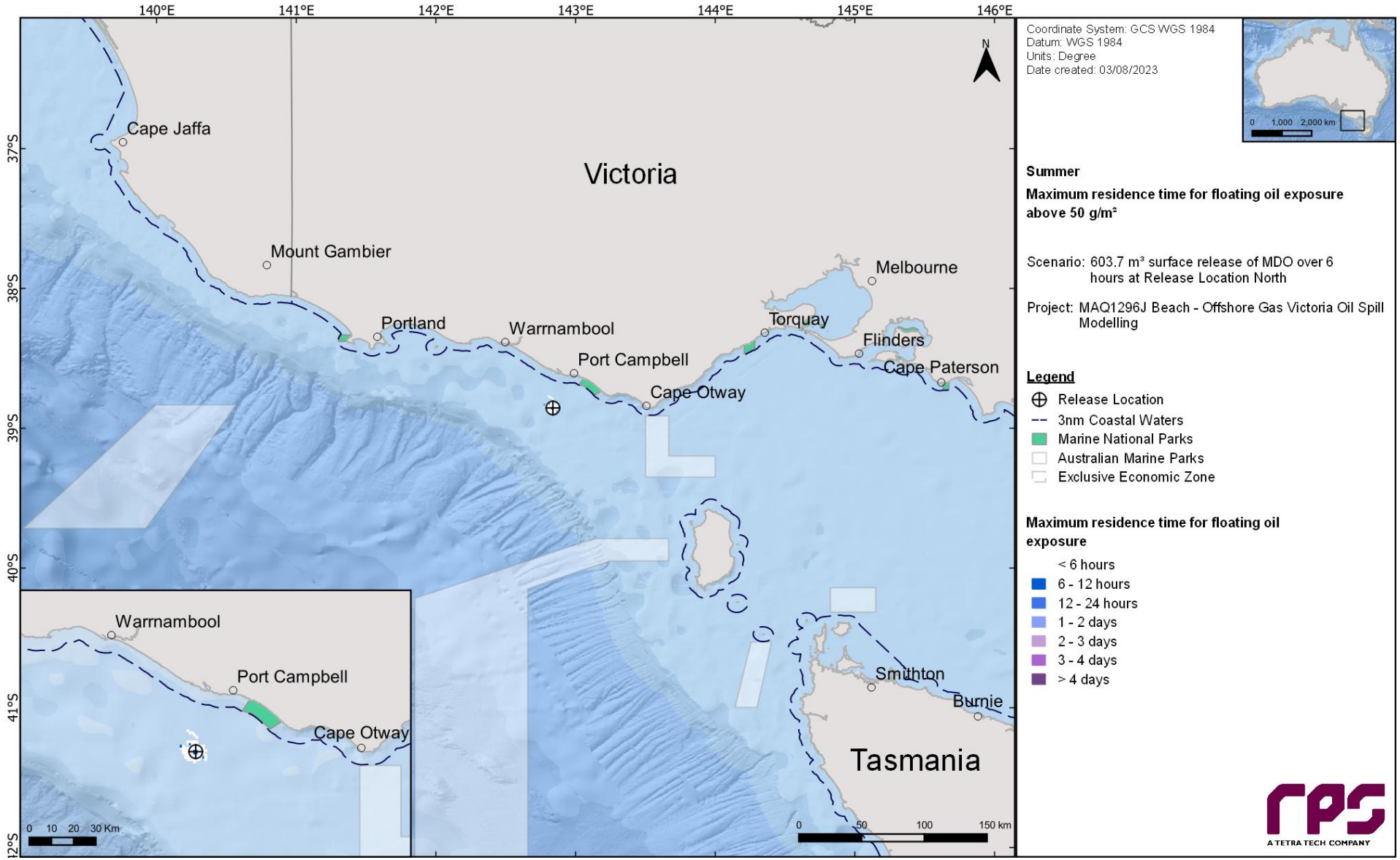

Figure 14-8 Maximum residence time of floating oil exposure above 50 g/m², in the event of 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations during summer conditions.

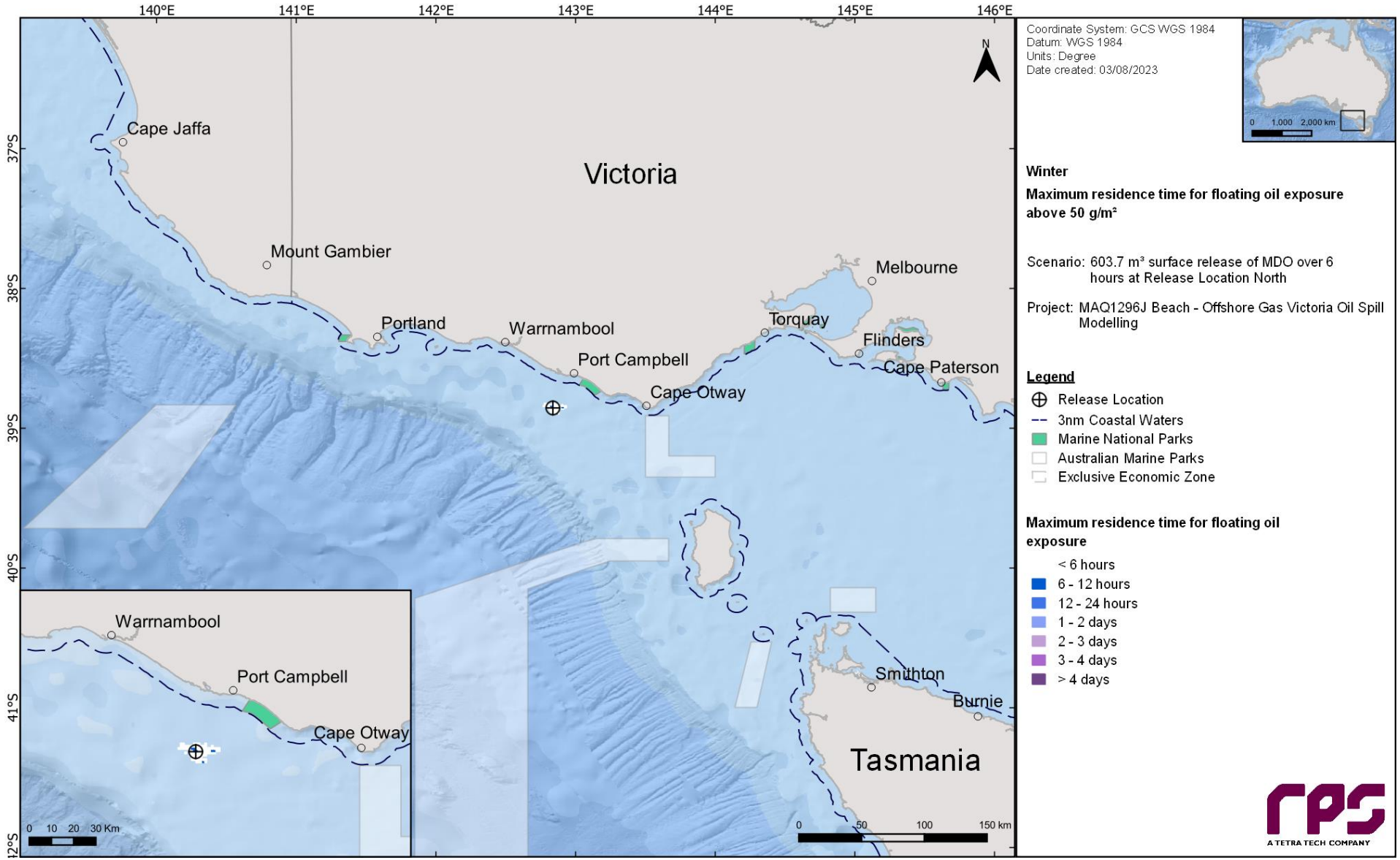

Figure 14-9 Maximum residence time of floating oil exposure above 50 g/m², in the event of 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations during winter conditions.

14.1.3 Shoreline Accumulation

Table 14-4 presents a summary of the predicted potential shoreline accumulation during the summer and winter conditions. The probability of accumulation to any shoreline at, or above, the low level (10 g/m^2) threshold was 28% during summer conditions and 26% during winter conditions. The minimum time before oil accumulation at, or above, the low threshold was 4 days during summer conditions, and 2 days during winter conditions. The maximum volume ashore for a single spill trajectory during the summer and winter conditions was 25 m^3 and 35 m^3, respectively, whilst the maximum length of shoreline accumulation at the low threshold was 26 km and 30 km, respectively. For the moderate threshold (100 g/m^2), the maximum length of shoreline accumulation predicted was 9 km and 10 km during summer and winter respectively. No shoreline accumulation was predicted for the high (1,000 g/m^2) threshold.

Table 14-5 summarises the shoreline accumulation on individual receptors during the summer and winter conditions. Colac Otway recorded the highest probability of shoreline accumulation at the low threshold with 24% (summer) and 20% (winter) and the largest shoreline accumulation with 24 m^3 and 34 m^3, respectively.

The minimum time before shoreline accumulation above the low threshold was 4 days predicted for Colac Otway and Cape Patton during summer conditions and 2 days during the winter conditions for the same receptors.

The summer and winter conditions maximum potential shoreline loading above the low, moderate and high shoreline thresholds are presented in Figure 14-10 and Figure 14-11, respectively.

Table 14-4 Summary of oil accumulation across all shorelines. Results are based on a 603.7 m^3 surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations per season.

Shoreline Statistics	Summer	Winter
Probability of accumulation on any shoreline (%)	28	26
Absolute minimum time for visible oil to shore (days)	4	2
Maximum total volume of hydrocarbons ashore (m^3)	25	35
Average volume of hydrocarbons ashore (m^3)	2	3
Maximum length of the shoreline at **10 g/m^2** (km)	26	30
Average shoreline length (km) at **10 g/m^2** (km)	9	11
Maximum length of the shoreline at **100 g/m^2** (km)	9	10
Average shoreline length (km) at **100 g/m^2** (km)	4	3
Maximum length of the shoreline at **1,000 g/m^2** (km)	-	-
Average shoreline length (km) at **1,000 g/m^2** (km)	-	-

Table 14-5 Summary of oil accumulation on individual shoreline receptors. Results are based on a 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations per season.

Shoreline Receptor		Summer																			Winter													
		Maximum probability of shoreline loading (%)			Minimum time before shoreline accumulation (days)			Load on shoreline (g/m²)		Volume on shoreline (m³)		Mean length of shoreline accumulation (km)			Maximum length of shoreline accumulation (km)			Maximum probability of shoreline loading (%)			Minimum time before shoreline accumulation (days)			Load on shoreline (g/m²)		Volume on shoreline (m³)		Mean length of shoreline accumulation (km)			Maximum length of shoreline accumulation (km)		
		Low	Mod	High	Low	Mod	High	Mean	Peak	Mean	Peak	Low	Mod	High	Low	Mod	High	Low	Mod	High	Low	Mod	High	Mean	Peak	Mean	Peak	Low	Mod	High	Low	Mod	High
SHORE	Colac Otway	24	3	-	4	7	-	5	253	2	24	8	3	-	24	8	-	20	6	-	2	4	-	5	516	3	34	9	3	-	21	9	-
	Corangamite	8	-	-	6	-	-	2	37	<1	4	2	-	-	8	-	-	10	2	-	3	4	-	6	166	2	15	6	5	-	15	6	-
	King Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	-	20	30	-	2	106	1	3	2	1	-	4	1	-
	Moyne	2	-	-	13	-	-	2	94	<1	4	6	-	-	9	-	-	1	-	-	7	-	-	2	13	<1	1	1	-	-	1	-	-
	Phillip Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	13	18	-	2	119	<1	4	8	1	-	8	1	-
	Surf Coast	3	-	-	12	-	-	2	23	<1	2	2	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sub-LGA	Apollo Bay	9	-	-	5	-	-	3	47	1	3	5	-	-	9	-	-	11	1	-	3	4	-	4	195	1	5	4	1	-	11	1	-
	Bay of Islands	2	-	-	13	-	-	2	94	<1	4	6	-	-	9	-	-	1	-	-	7	-	-	2	13	<1	1	1	-	-	1	-	-
	Cape Otway West	17	3	-	4	7	-	5	253	1	22	6	3	-	15	8	-	18	5	-	2	4	-	9	516	3	32	7	4	-	19	9	-
	Cape Patton	8	-	-	8	-	-	4	76	1	7	6	-	-	14	-	-	4	-	-	10	-	-	3	45	<1	3	3	-	-	6	-	-
	Lorne	5	-	-	12	-	-	3	86	1	3	3	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Moonlight Head	6	-	-	6	-	-	2	37	<1	2	2	-	-	6	-	-	10	2	-	3	4	-	7	166	2	15	5	5	-	13	6	-
	Port Campbell	3	-	-	11	-	-	2	32	<1	1	2	-	-	3	-	-	2	-	-	7	-	-	2	30	<1	2	3	-	-	4	-	-

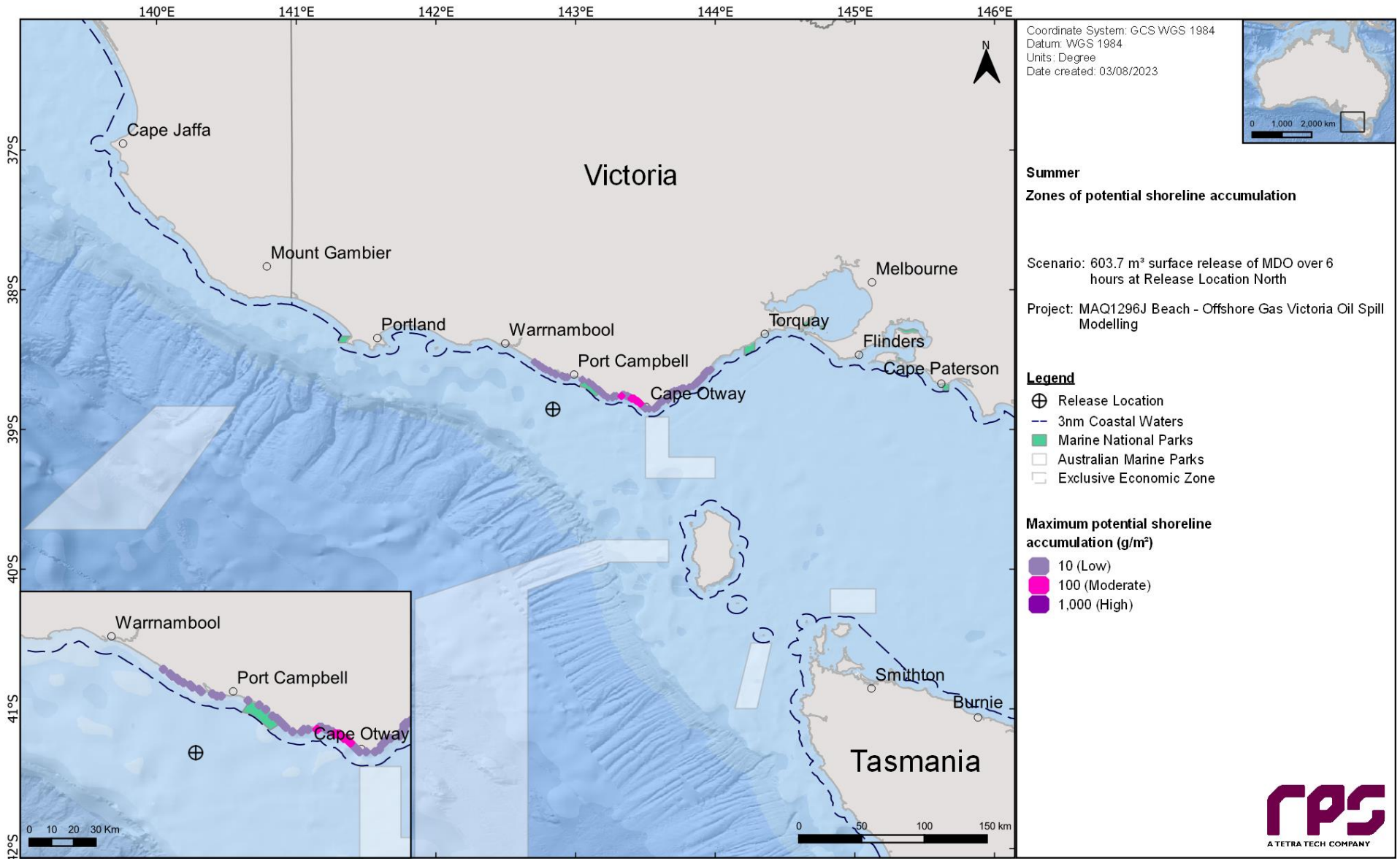

Figure 14-10 Maximum potential shoreline loading in the event of a 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations during summer conditions.

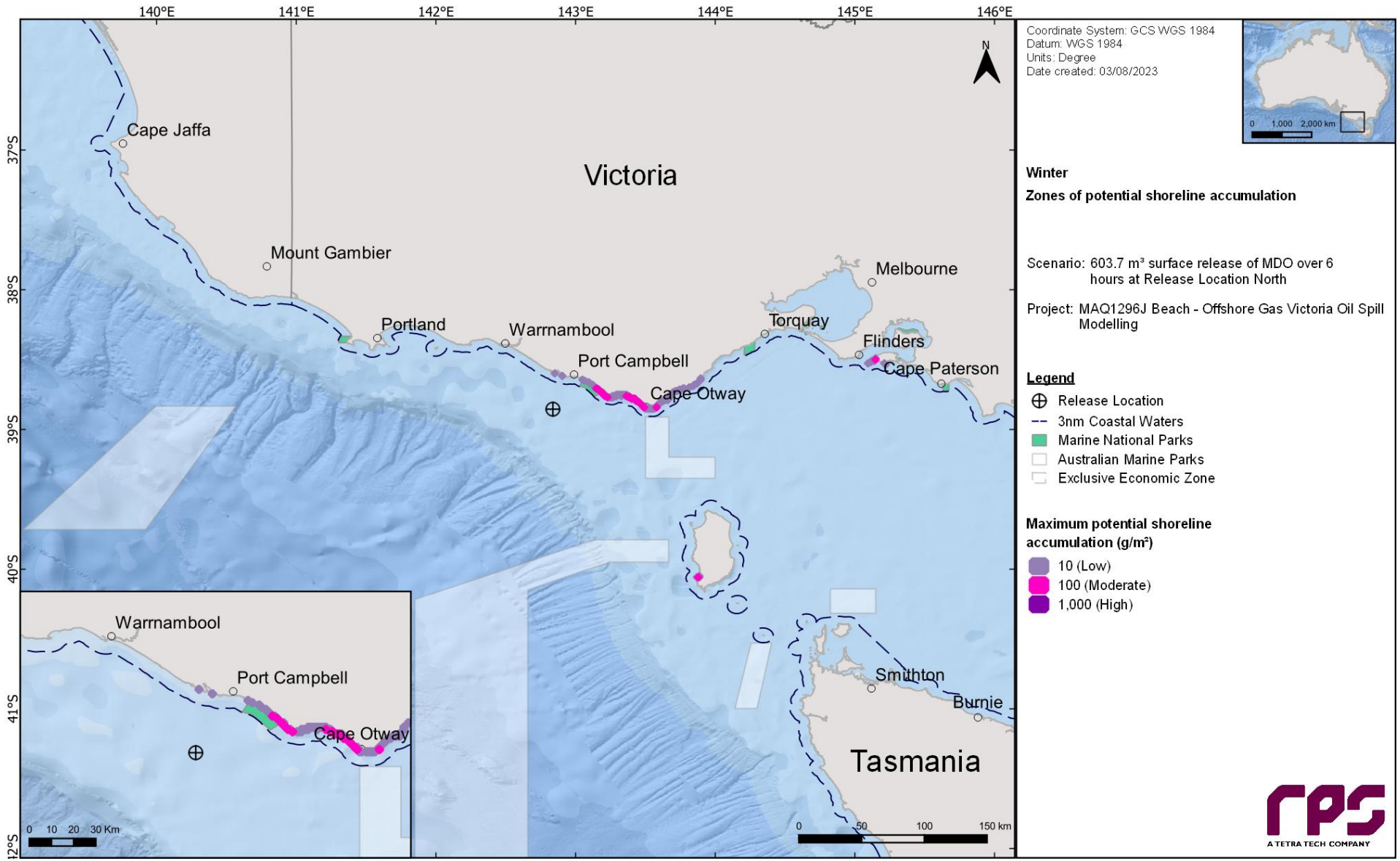

Figure 14-11 Maximum potential shoreline loading in the event of a 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations during winter conditions.

14.1.4 In-water exposure

14.1.4.1 Dissolved Hydrocarbons

Table 14-6 summarises the probability of exposure to individual receptors from dissolved hydrocarbons in the 0-10 m layer during the summer and winter conditions. No dissolved hydrocarbon exposure at the high (400 ppb) threshold was predicted,

Outside of the receptors that the Release Location North resides within (refer to Table 10-3), the highest concentration of dissolved hydrocarbon was predicted for the Southern Right Whale - Aggregation BIA in summer (45 ppb) and in Apollo AMP in winter (31 ppb). The highest probability of low dissolved hydrocarbon exposure was recorded for Pygmy Blue Whale - Foraging BIA (summer – 3%, winter – 8%) and Short-tailed Shearwater – Foraging (summer – 3%, winter – 9%).

Table 14-7 presents the predicted minimum time to dissolved hydrocarbon exposure and maximum residence time for dissolved hydrocarbon exposure to individual receptors, in the 0-10 m depth layer, for all seasonal conditions and all thresholds assessed. The maximum residence time of dissolved hydrocarbon exposure at the low threshold was 1 day both during summer and winter.

Figure 14-12 and Figure 14-13 presents the zones of potential dissolved hydrocarbon exposure for the 0-10 m depth layer, for each threshold assessed under summer and winter conditions, respectively.

Figure 14-14 to Figure 14.17 present the maximum residence time of dissolved hydrocarbon exposure for the NOPSEMA thresholds in summer and winter.

Table 14-6 Probability of dissolved hydrocarbons exposure to marine based receptors in the 0–10 m dept. Results are based on a 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March)				Winter (April to October)			
		Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure			Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure		
			Low	Moderate	High		Low	Moderate	High
AMP	Apollo	16	1	-	-	31	3	-	-
BIA	Antipodean Albatross - Foraging*	151	55	15	-	156	59	20	-
	Black-browed Albatross - Foraging*	151	55	15	-	156	59	20	-
	Bullers Albatross - Foraging*	151	55	15	-	156	59	20	-
	Campbell Albatross – Foraging*	151	55	15	-	156	59	20	-
	Common Diving-petrel – Foraging*	151	55	15	-	156	59	20	-
	Indian Yellow-nosed Albatross – Foraging*	151	55	15	-	156	59	20	-
	Pygmy Blue Whale – Distribution*	151	55	15	-	156	59	20	-
	Pygmy Blue Whale - Foraging	32	3	-	-	101	8	1	-
	Pygmy Blue Whale - Foraging (annual high use area)*	151	55	15	-	156	59	20	-
	Pygmy Blue Whale - Known Foraging Area	14	1	-	-	28	2	-	-
	Short-tailed Shearwater - Foraging	32	3	-	-	101	9	1	-
	Shy Albatross – Foraging*	151	55	15	-	156	59	20	-
	Southern Right Whale - Aggregation	45	2	-	-	25	2	-	-
	Southern Right Whale - Known Core Range*	151	55	15	-	156	59	20	-
	Wandering Albatross – Foraging*	151	55	15	-	156	59	20	-
	Wedge-tailed Shearwater – Foraging*	151	55	15	-	156	59	20	-
	White Shark – Distribution*	151	55	15	-	156	59	20	-
	White Shark - Foraging	12	1	-	-	3	-	-	-
	White-faced Storm-petrel - Foraging	10	1	-	-	20	2	-	-
EEZ	Australian*	151	55	15	-	156	59	20	-
IBRA	Otway Plain	2	-	-	-	19	1	-	-
IBRA	Otway Ranges	2	-	-	-	22	1	-	-
IMCRA	Central Bass Strait	8	-	-	-	20	2	-	-

Receptor		Summer (November through to March)				Winter (April to October)			
		Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure			Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure		
			Low	Moderate	High		Low	Moderate	High
IMCRA	Central Victoria	13	1	-	-	28	1	-	-
IMCRA	Otway*	151	55	15	-	156	59	20	-
SHORE	Colac Otway	2	-	-	-	22	1	-	-
State Waters	Victoria State Waters	9	-	-	-	41	2	-	-
Sub-LGA	Apollo Bay	2	-	-	-	22	1	-	-
	Cape Otway West	2	-	-	-	11	1	-	-

*The release location resides within the receptor boundaries.

Table 14-7 Predicted minimum time to dissolved hydrocarbon exposure and maximum residence time for dissolved hydrocarbon exposure to individual receptors in the 0-10 m depth layer. Results are based on a 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill trajectories per season.

Receptor		Summer (November through to March)						Winter (April to October)					
		Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)			Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
AMP	Apollo	3	-	-	< 1	-	-	1	-	-	< 1	-	-
BIA	Antipodean Albatross - Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Black-browed Albatross - Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Bullers Albatross - Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Campbell Albatross – Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Common Diving-petrel – Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Indian Yellow-nosed Albatross – Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Pygmy Blue Whale – Distribution*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Pygmy Blue Whale - Foraging	1	2	-	< 1	< 1	-	1	1	-	< 1	< 1	-
	Pygmy Blue Whale - Foraging (annual high use area)*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Pygmy Blue Whale - Known Foraging Area	4	-	-	< 1	-	-	2	-	-	< 1	-	-
	Short-tailed Shearwater - Foraging	< 1	2	-	< 1	< 1	-	1	1	-	< 1	< 1	-
	Shy Albatross – Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Southern Right Whale - Aggregation	2	4	-	< 1	-	-	1	-	-	< 1	-	-
	Southern Right Whale - Known Core Range*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Wandering Albatross – Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Wedge-tailed Shearwater – Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	White Shark – Distribution*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	White Shark - Foraging	6	-	-	< 1	-	-	-	-	-	-	-	-
	White-faced Storm-petrel - Foraging	5	-	-	< 1	-	-	2	-	-	< 1	-	-
EEZ	Australian*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
IBRA	Otway Plain	-	-	-	-	-	-	2	-	-	< 1	-	-
	Otway Ranges	-	-	-	-	-	-	2	-	-	< 1	-	-

Receptor		Summer (November through to March)						Winter (April to October)					
		Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)			Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
IMCRA	Central Bass Strait	9	-	-	-	-	-	2	-	-	< 1	-	-
	Central Victoria	5	-	-	< 1	-	-	2	-	-	< 1	-	-
	Otway*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
SHORE	Colac Otway	-	-	-	-	-	-	2	-	-	< 1	-	-
State Waters	Victoria State Waters	4	-	-	< 1	-	-	1	-	-	< 1	-	-
Sub-LGA	Apollo Bay	-	-	-	-	-	-	2	-	-	< 1	-	-
	Cape Otway West	-	-	-	-	-	-	2	-	-	< 1	-	-

*The release location resides within the receptor boundaries.

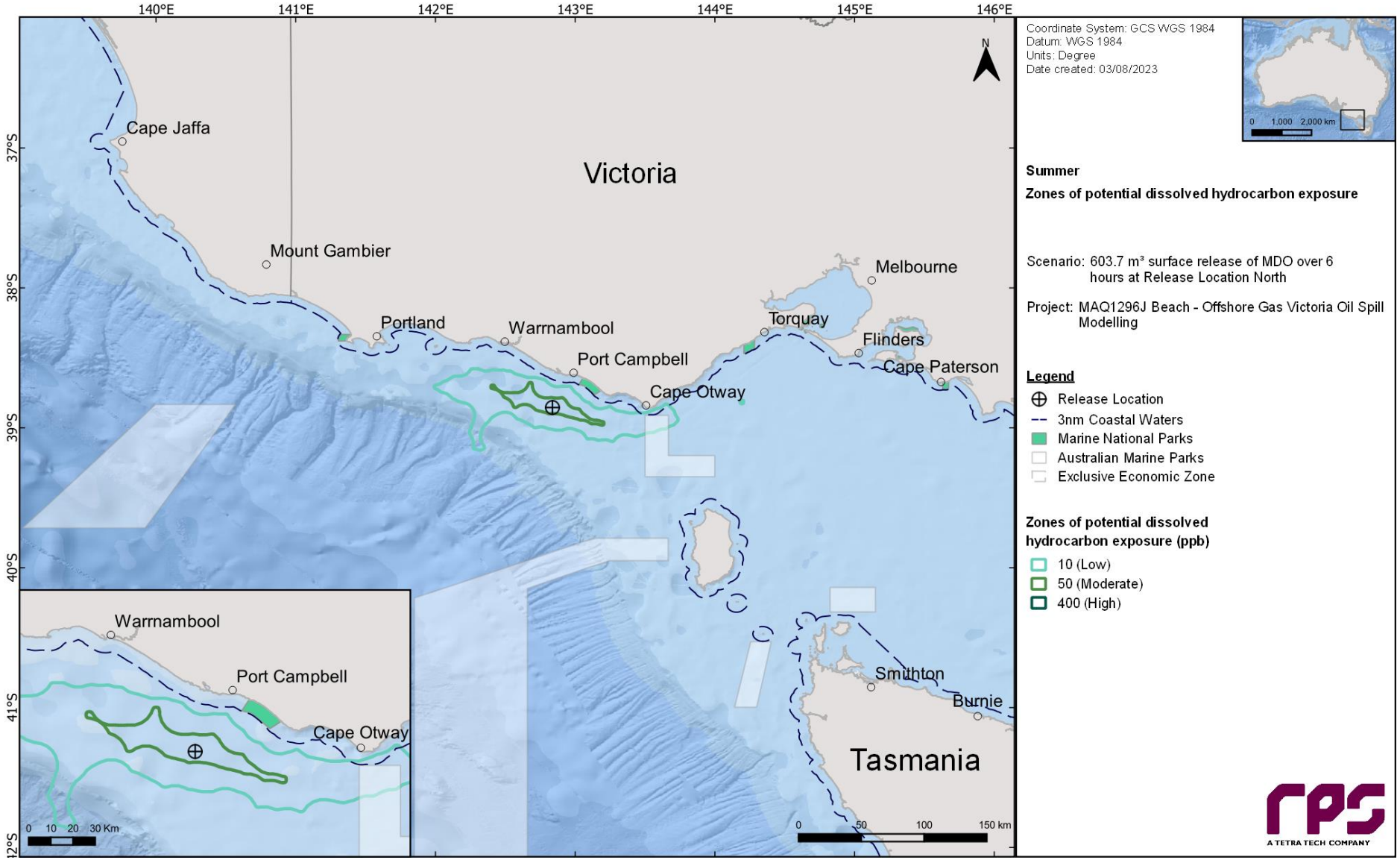

Figure 14-12 Zones of potential dissolved hydrocarbon exposure at 0-10 m below the sea in the event of a 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations during summer conditions.

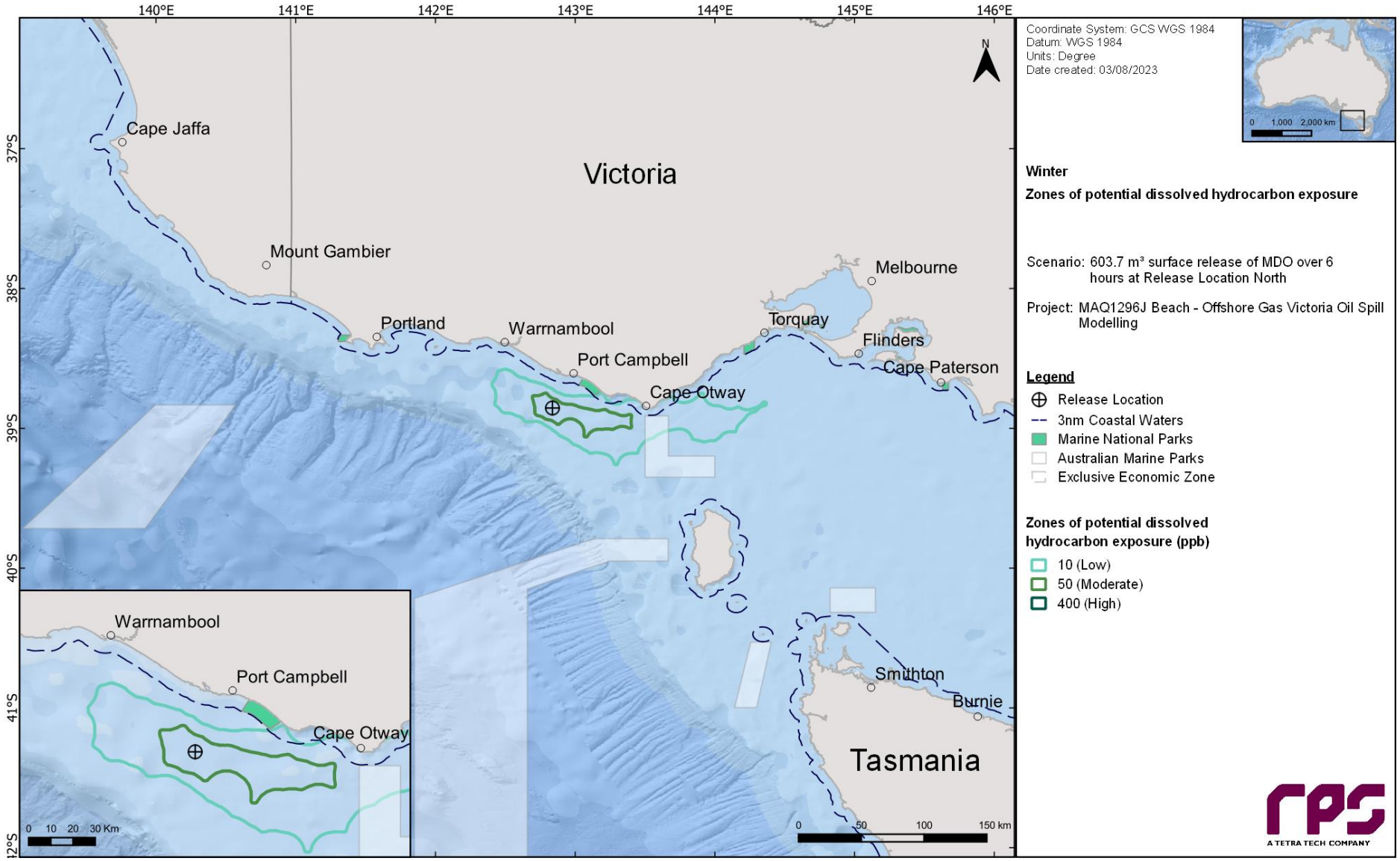

Figure 14-13 Zones of potential dissolved hydrocarbon exposure at 0-10 m below the sea in the event of a 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations during winter conditions.

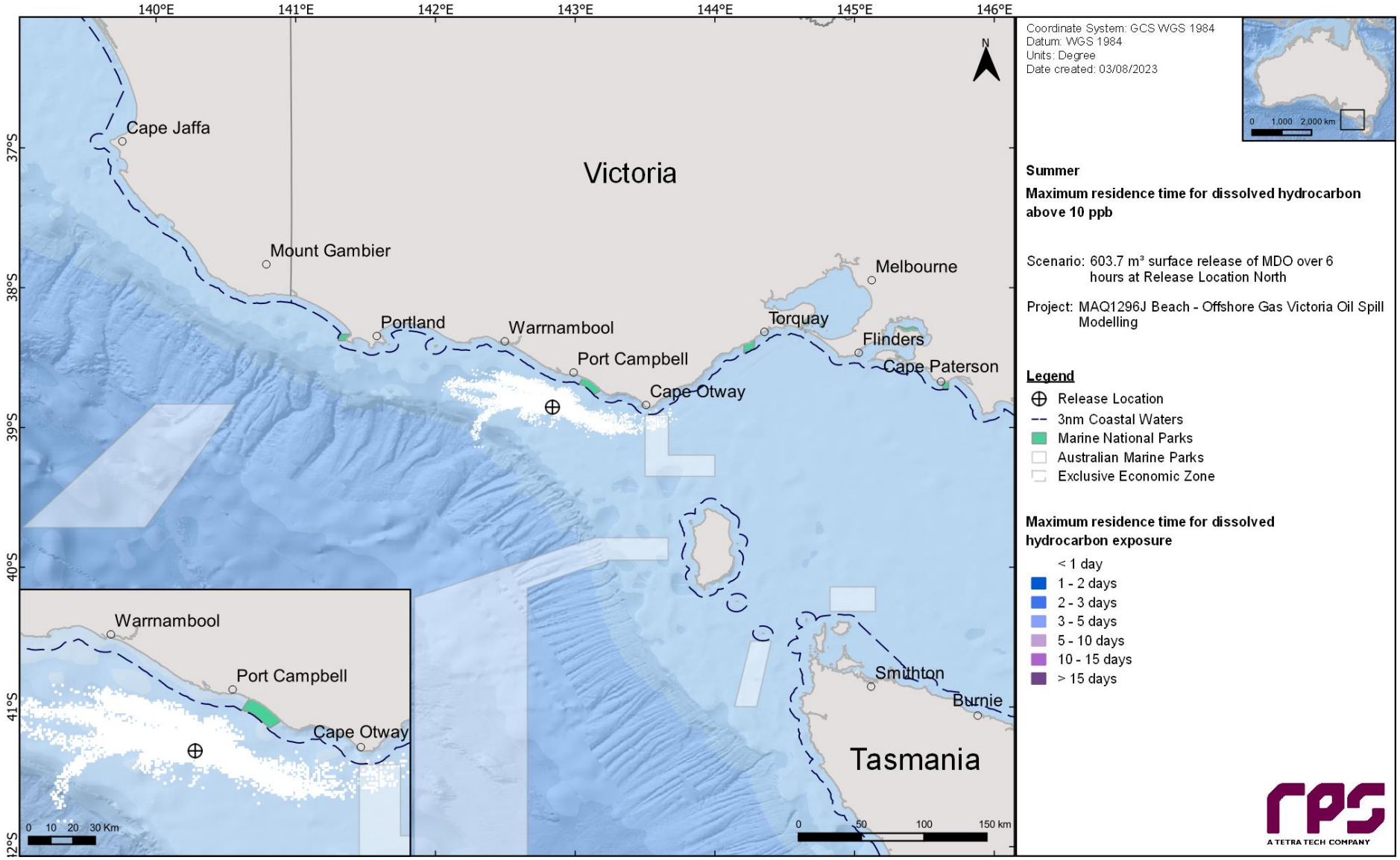

Figure 14-14 Maximum residence time for dissolved hydrocarbon exposure above 10 ppb, at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations during summer conditions.

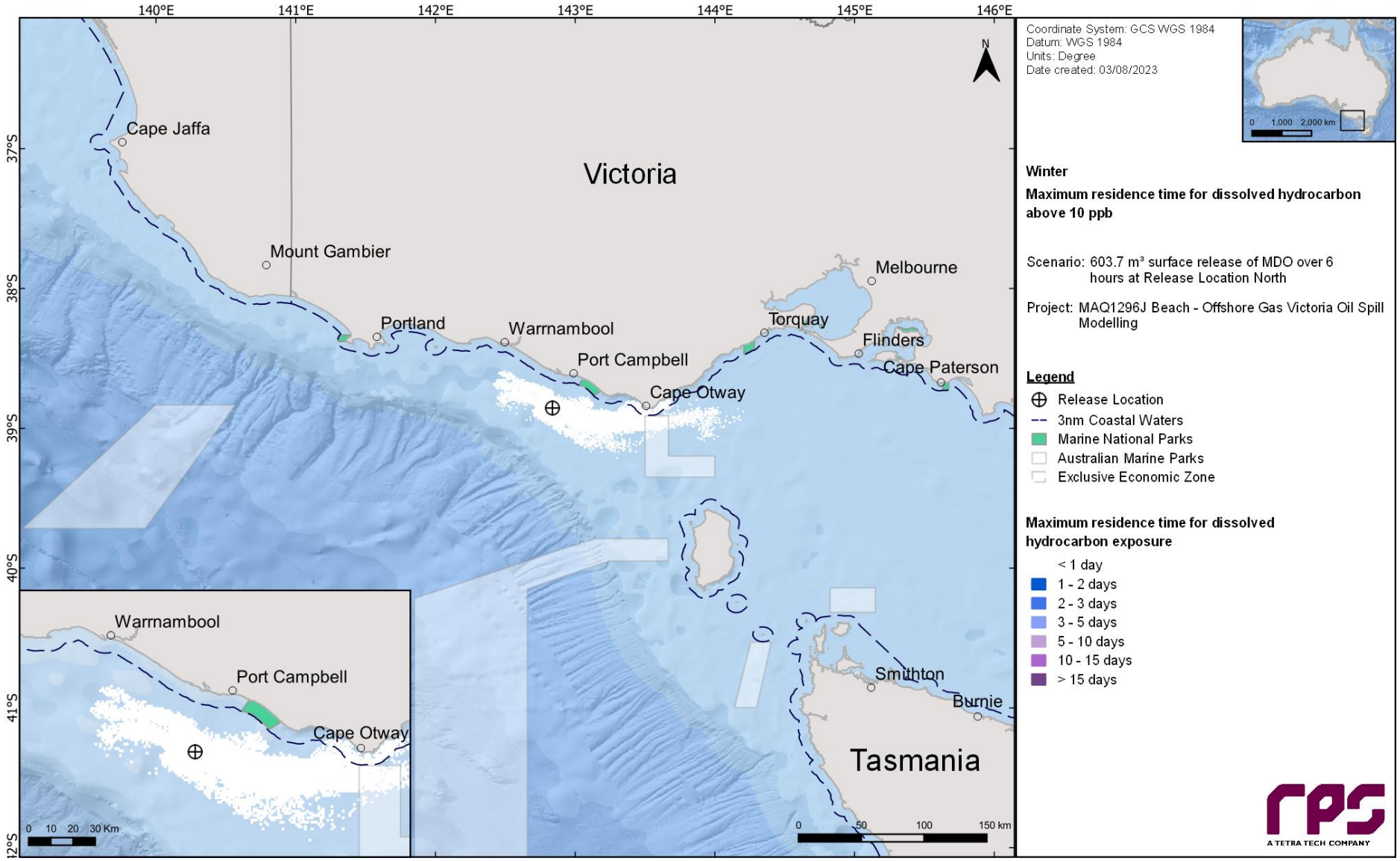

Figure 14.15 Maximum residence time for dissolved hydrocarbon exposure above 10 ppb, at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations during winter conditions.

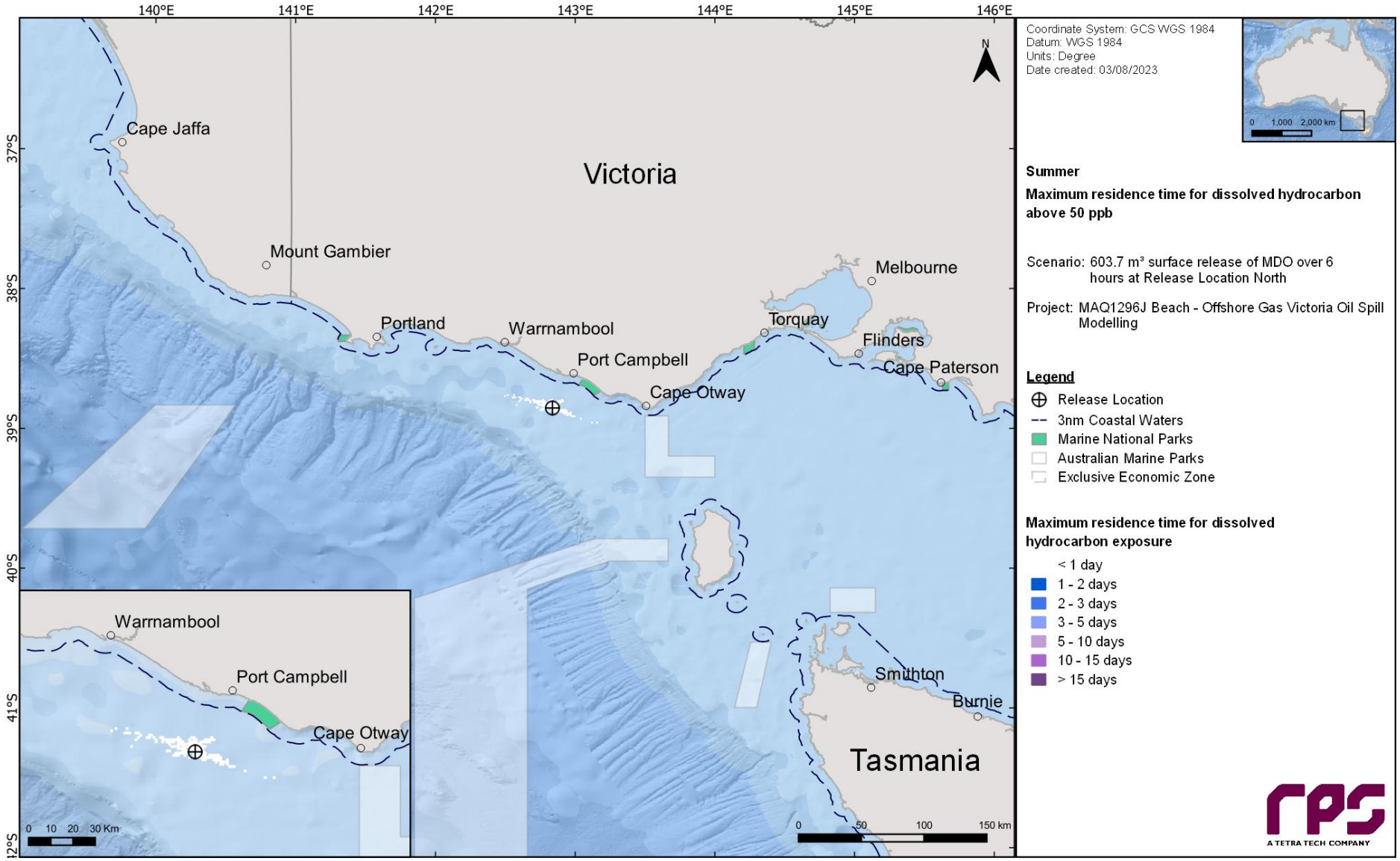

Figure 14.16 Maximum residence time for dissolved hydrocarbon exposure above 50 ppb, at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations during summer conditions.

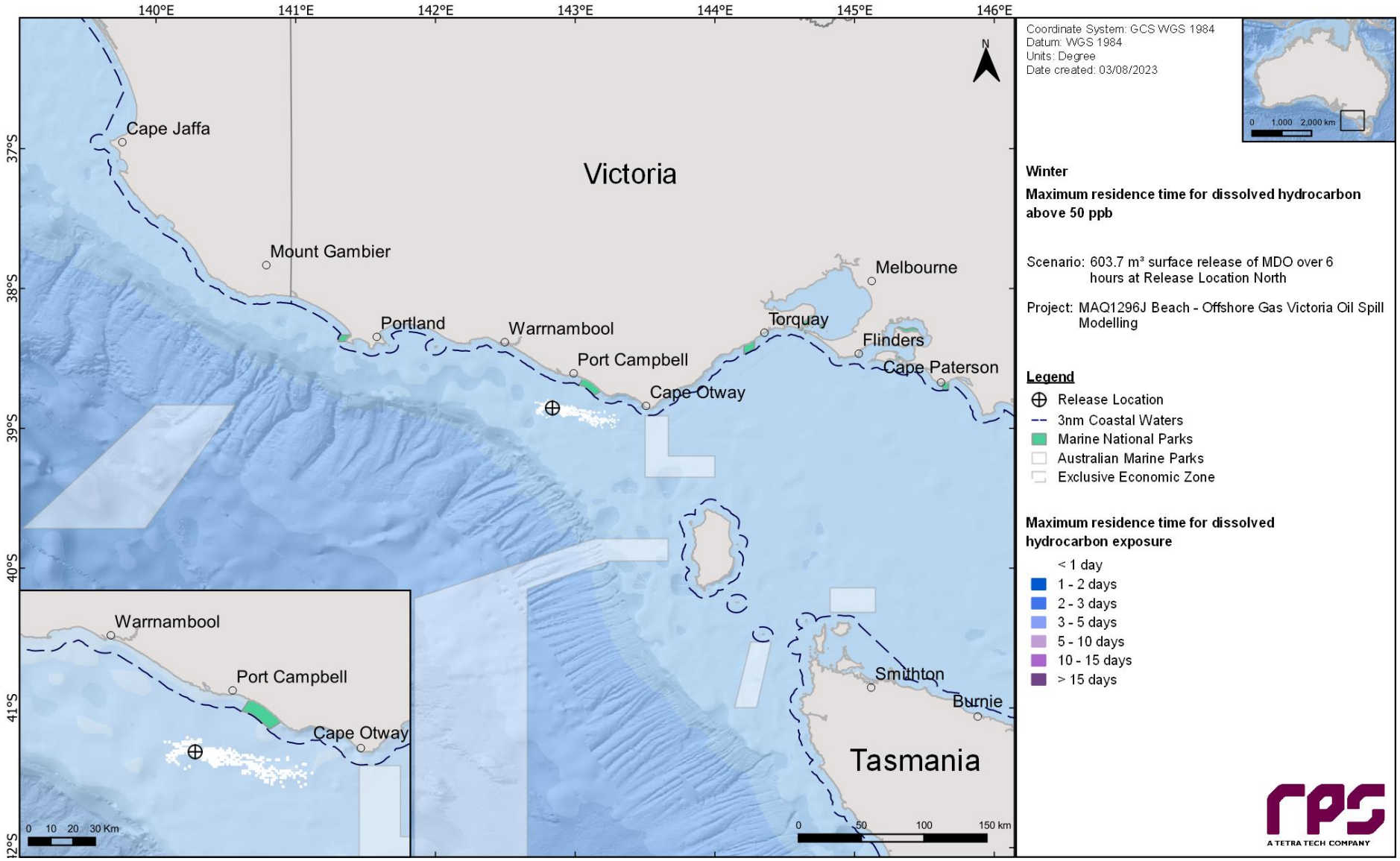

Figure 14.17 Maximum residence time for dissolved hydrocarbon exposure above 50 ppb, at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations during winter conditions.

14.1.4.2 Entrained Hydrocarbons

Table 14-8 presents the probability of exposure to individual receptors from entrained hydrocarbons in the 0-10 m depth layer for the summer and winter conditions.

Outside of the receptors that the Release Location North resides within (refer to Table 10-3), the highest concentration of entrained hydrocarbon was predicted for Short-tailed Shearwater - Foraging BIA (summer – 801 ppb, winter – 1,326ppb), which also presented the highest probability of low entrained hydrocarbon exposure (summer – 51%, winter – 81%).

Table 14-9 presents the predicted minimum time to entrained hydrocarbon exposure and maximum residence time for entrained hydrocarbon exposure to individual receptors in the 0-10 m depth layer, for all seasonal conditions and all thresholds assessed.

Figure 14-18 and Figure 14-19 present the zones of potential entrained hydrocarbon exposure for the 0-10 m depth layer, for each threshold assessed under summer and winter conditions, respectively.

Figure 14-20 to Figure 14-23 present the maximum residence time of entrained hydrocarbon exposure for the NOPSEMA thresholds in summer and winter.

Table 14-8 Probability of entrained hydrocarbons exposure to marine based receptors in the 0–10 m depth layer. Results are based on a 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March)			Winter (April to October)		
		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure	
			Low	High		Low	High
AMP	Apollo	139	29	2	392	63	9
BIA	Antipodean Albatross - Foraging*	13,567	97	89	12,277	97	92
	Australasian Gannet - Foraging	43	6	-	58	4	-
	Black-browed Albatross - Foraging*	13,567	97	89	12,277	97	92
	Bullers Albatross - Foraging*	13,567	97	89	12,277	97	92
	Campbell Albatross – Foraging*	13,567	97	89	12,277	97	92
	Common Diving-petrel – Foraging*	13,567	97	89	12,277	97	92
	Indian Yellow-nosed Albatross – Foraging*	13,567	97	89	12,277	97	92
	Little Penguin - Foraging	2	-	-	13	1	-
	Pygmy Blue Whale – Distribution*	13,567	97	89	12,277	97	92
	Pygmy Blue Whale - Foraging	665	49	19	1,146	78	34
	Pygmy Blue Whale - Foraging (annual high use area)*	13,567	97	89	12,277	97	92
	Pygmy Blue Whale - Known Foraging Area	102	27	1	370	60	6
	Short-tailed Shearwater - Foraging	801	51	21	1,326	81	37
	Shy Albatross – Foraging*	13,567	97	89	12,277	97	92
	Southern Right Whale - Aggregation	440	30	2	365	9	2
	Southern Right Whale - Known Core Range*	13,567	97	89	12,277	97	92
	Wandering Albatross – Foraging*	13,567	97	89	12,277	97	92
	Wedge-tailed Shearwater – Foraging*	13,567	97	89	12,277	97	92
	White Shark – Distribution*	13,567	97	89	12,277	97	92
	White Shark - Foraging	81	10	-	19	4	-
	White-faced Storm-petrel - Foraging	94	25	-	370	56	5
EEZ	Australian*	13,567	97	89	12,277	97	92
IBRA	Gippsland Plain	1	-	-	13	1	-

Receptor		Summer (November through to March)			Winter (April to October)		
		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure	
			Low	High		Low	High
	Otway Plain	84	12	-	224	19	3
	Otway Ranges	50	10	-	183	13	2
	Warrnambool Plain	40	7	-	173	11	1
IMCRA	Central Bass Strait	76	20	-	362	56	5
	Central Victoria	102	27	1	370	59	6
	Otway*	13,567	97	89	12,277	97	92
	Victorian Embayments	1	-	-	11	1	-
KEF	Bonney Coast Upwelling	18	1	-	1	-	-
	West Tasmania Canyons	31	1	-	10	1	-
MNP	Twelve Apostles	40	10	-	224	9	1
RSB	Bravenes Rock	70	16	-	134	25	1
SHORE	Colac Otway	84	12	-	224	19	3
	Corangamite	40	8	-	173	11	1
	Moyne	15	3	-	13	1	-
	Phillip Island	1	-	-	11	1	-
State Waters	Victoria State Waters	102	21	1	466	32	7
Sub-LGA	Apollo Bay	34	10	-	183	13	2
	Bay of Islands	15	3	-	13	1	-
	Cape Otway West	84	12	-	207	19	3
	Cape Patton	24	7	-	19	3	-
	Childers Cove	7	-	-	15	1	-
	Lorne	12	1	-	5	-	-
	Moonlight Head	40	8	-	173	11	1
	Port Campbell	15	3	-	42	3	-

*The release location resides within the receptor boundaries.

Table 14-9 Predicted minimum time to entrained hydrocarbon exposure and maximum residence time for entrained hydrocarbon exposure to individual receptors in the 0-10 m depth layer. Results are based on a 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill trajectories per season.

Receptor		Summer (November through to March)				Winter (April to October)			
		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)	
		Low	High	Low	High	Low	High	Low	High
AMP	Apollo	2	2	5	< 1	1	1	10	1
BIA	Antipodean Albatross – Foraging*	<1	<1	14	4	<1	<1	12	4
	Australasian Gannet – Foraging	4	-	3	-	4	-	4	-
	Black-browed Albatross – Foraging*	<1	<1	14	4	<1	<1	12	4
	Bullers Albatross – Foraging*	<1	<1	14	4	<1	<1	12	4
	Campbell Albatross – Foraging*	<1	<1	14	4	<1	<1	12	4
	Common Diving-petrel – Foraging*	<1	<1	14	4	<1	<1	13	4
	Indian Yellow-nosed Albatross – Foraging*	<1	<1	14	4	<1	<1	12	4
	Little Penguin – Foraging	-	-	-	-	13	-	< 1	-
	Pygmy Blue Whale – Distribution*	<1	<1	14	4	<1	<1	13	4
	Pygmy Blue Whale – Foraging	<1	<1	13	1	<1	<1	13	2
	Pygmy Blue Whale – Foraging (annual high use area)*	<1	<1	14	4	<1	<1	13	4
	Pygmy Blue Whale – Known Foraging Area	3	3	12	-	1	1	10	1
	Short-tailed Shearwater – Foraging	<1	<1	13	3	<1	<1	12	3
	Shy Albatross – Foraging*	<1	<1	14	4	<1	<1	13	4
	Southern Right Whale – Aggregation	1	1	8	1	1	1	8	2
	Southern Right Whale – Known Core Range*	<1	<1	14	4	<1	<1	13	4
	Wandering Albatross – Foraging*	<1	<1	14	4	<1	<1	12	4
	Wedge-tailed Shearwater – Foraging*	<1	<1	14	4	<1	<1	13	4
	White Shark – Distribution*	<1	<1	14	4	<1	<1	12	4
	White Shark – Foraging	3	-	4	-	7	-	4	-
	White-faced Storm-petrel - Foraging	3	-	12	-	1	1	9	1
EEZ	Australian*	<1	<1	14	4	<1	<1	13	4
IBRA	Gippsland Plain	-	-	-	-	13	-	< 1	-

Receptor		Summer (November through to March)				Winter (April to October)			
		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)	
		Low	High	Low	High	Low	High	Low	High
	Otway Plain	3	-	12	-	1	1	11	3
	Otway Ranges	3	-	6	-	1	2	9	< 1
	Warrnambool Plain	3	-	3	-	2	2	13	1
IMCRA	Central Bass Strait	3	-	5	-	1	2	7	< 1
	Central Victoria	3	3	12	-	1	1	8	1
	Otway*	<1	<1	14	4	<1	<1	13	4
	Victorian Embayments	-	-	-	-	13	-	< 1	-
KEF	Bonney Coast Upwelling	9	-	2	-	-	-	-	-
	West Tasmania Canyons	6	-	3	-	15	-	< 1	-
MNP	Twelve Apostles	3	-	4	-	2	2	13	2
RSB	Bravenes Rock	2	-	4	-	2	3	2	< 1
SHORE	Colac Otway	3	-	12	-	1	1	11	3
	Corangamite	4	-	3	-	2	2	13	1
	Moyne	12	-	1	-	5	-	< 1	-
	Phillip Island	-	-	-	-	13	-	< 1	-
State Waters	Victoria State Waters	1	4	13	< 1	1	1	13	3
Sub-LGA	Apollo Bay	3	-	3	-	1	2	8	< 1
	Bay of Islands	12	-	1	-	5	-	< 1	-
	Cape Otway West	3	-	12	-	1	2	11	3
	Cape Patton	5	-	3	-	6	-	1	-
	Childers Cove	-	-	-	-	3	-	< 1	-
	Lorne	13	-	< 1	-	-	-	-	-
	Moonlight Head	3	-	3	-	2	2	13	1
	Port Campbell	5	-	1	-	3	-	2	-

*The release location resides within the receptor boundaries.

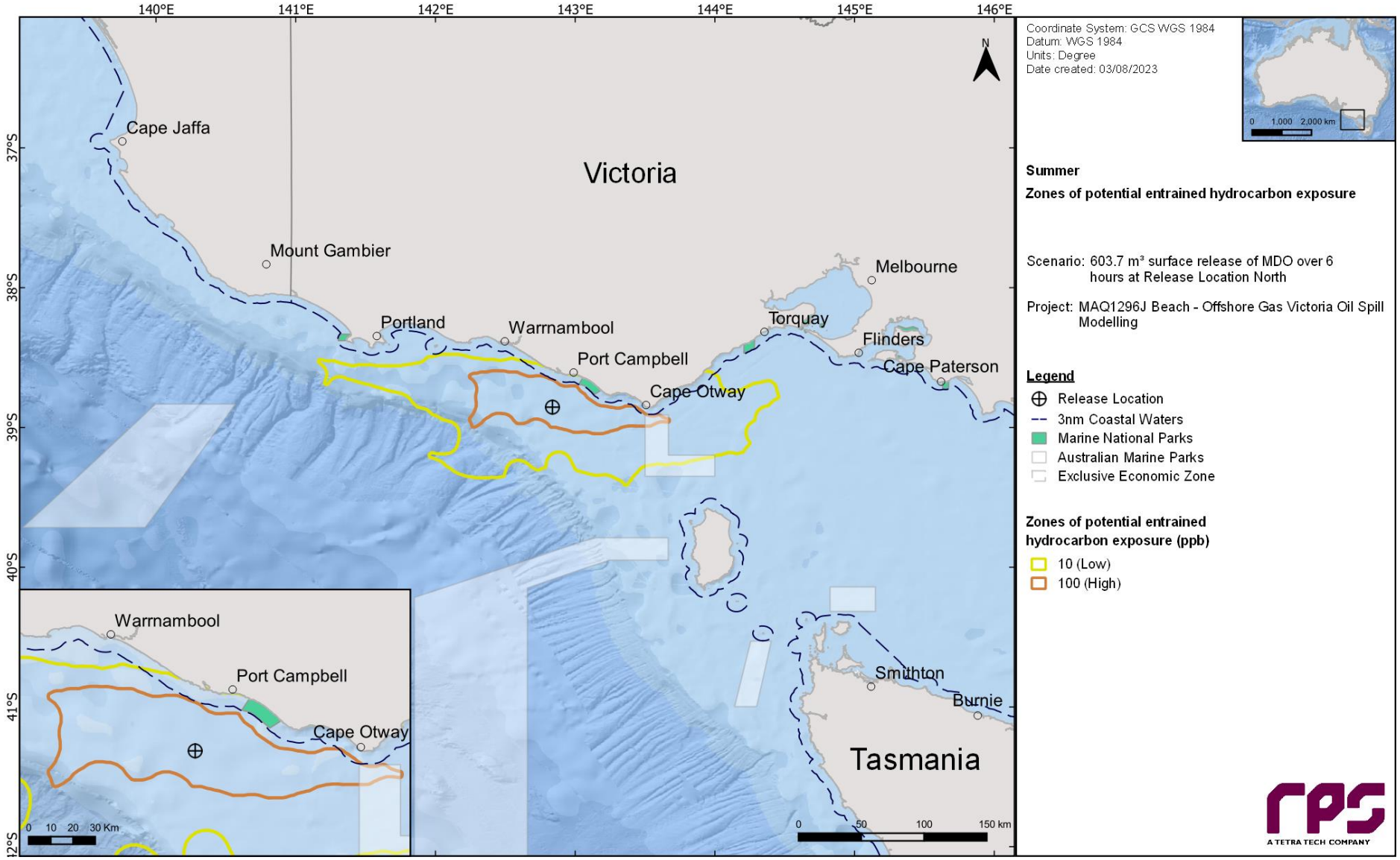

Figure 14-18 Zones of potential entrained hydrocarbon exposure at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations during summer conditions.

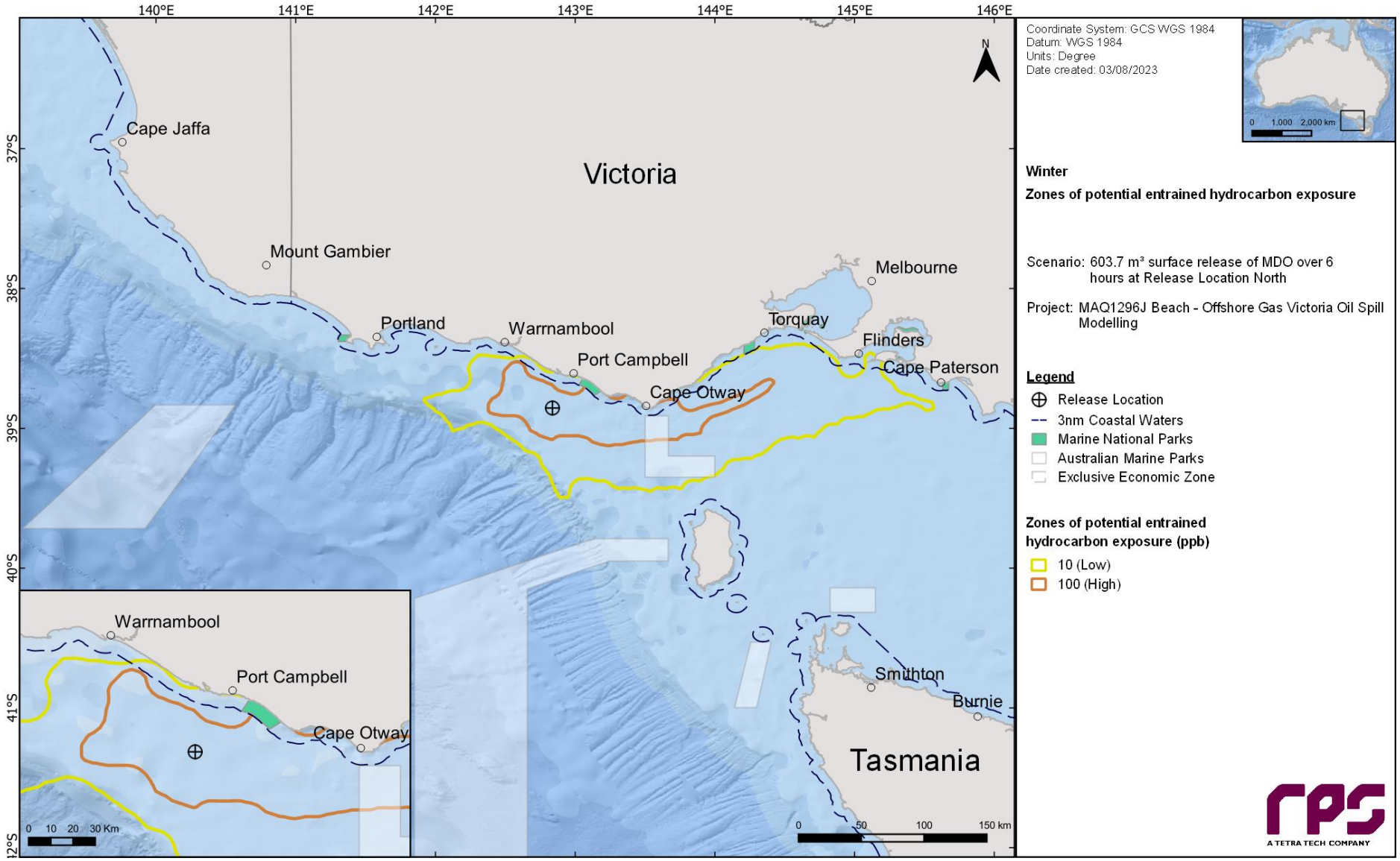

Figure 14-19 Zones of potential entrained hydrocarbon exposure at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations during winter conditions.

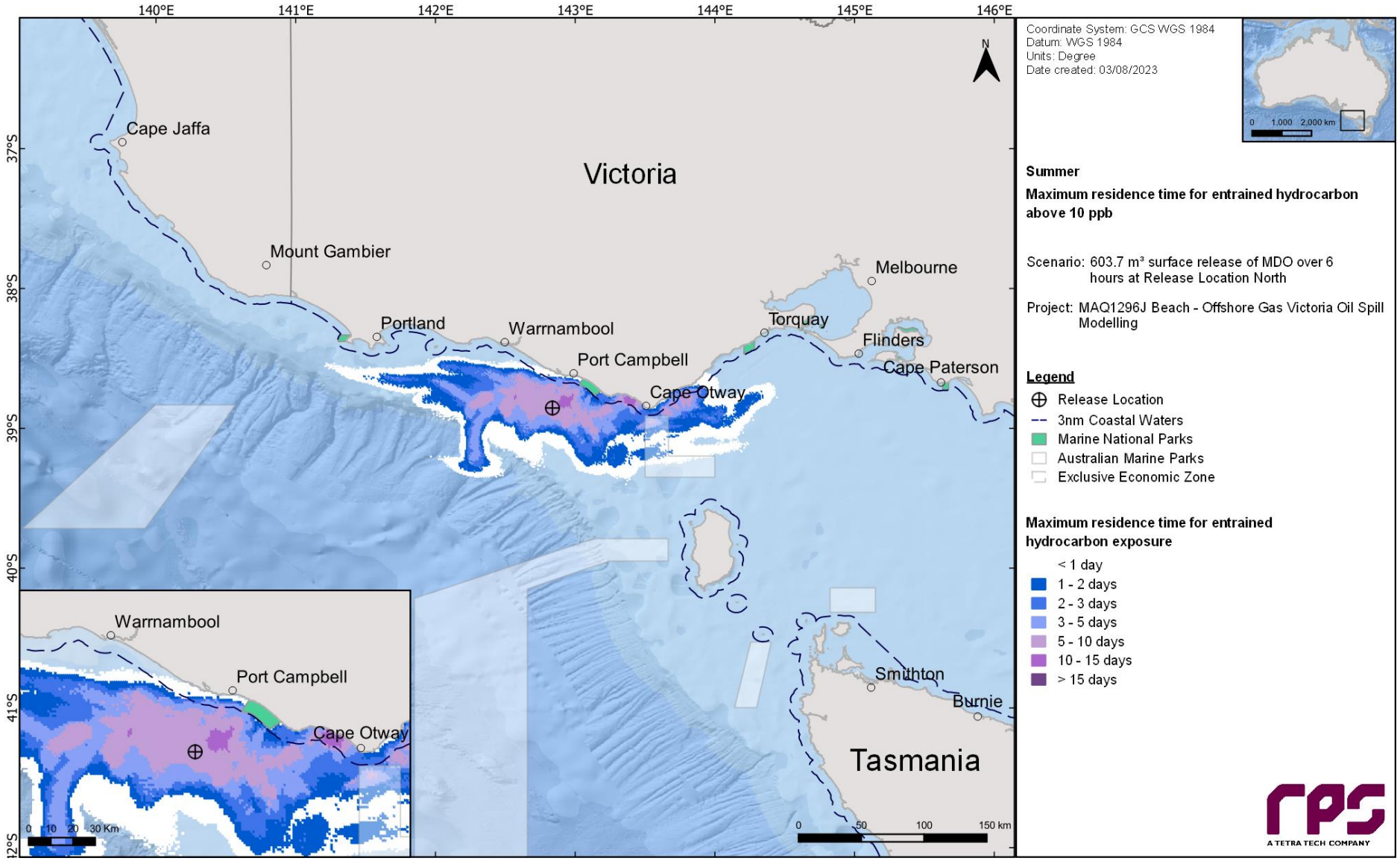

Figure 14-20 Maximum residence time for entrained hydrocarbon exposure above 10 ppb, at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations during summer conditions.

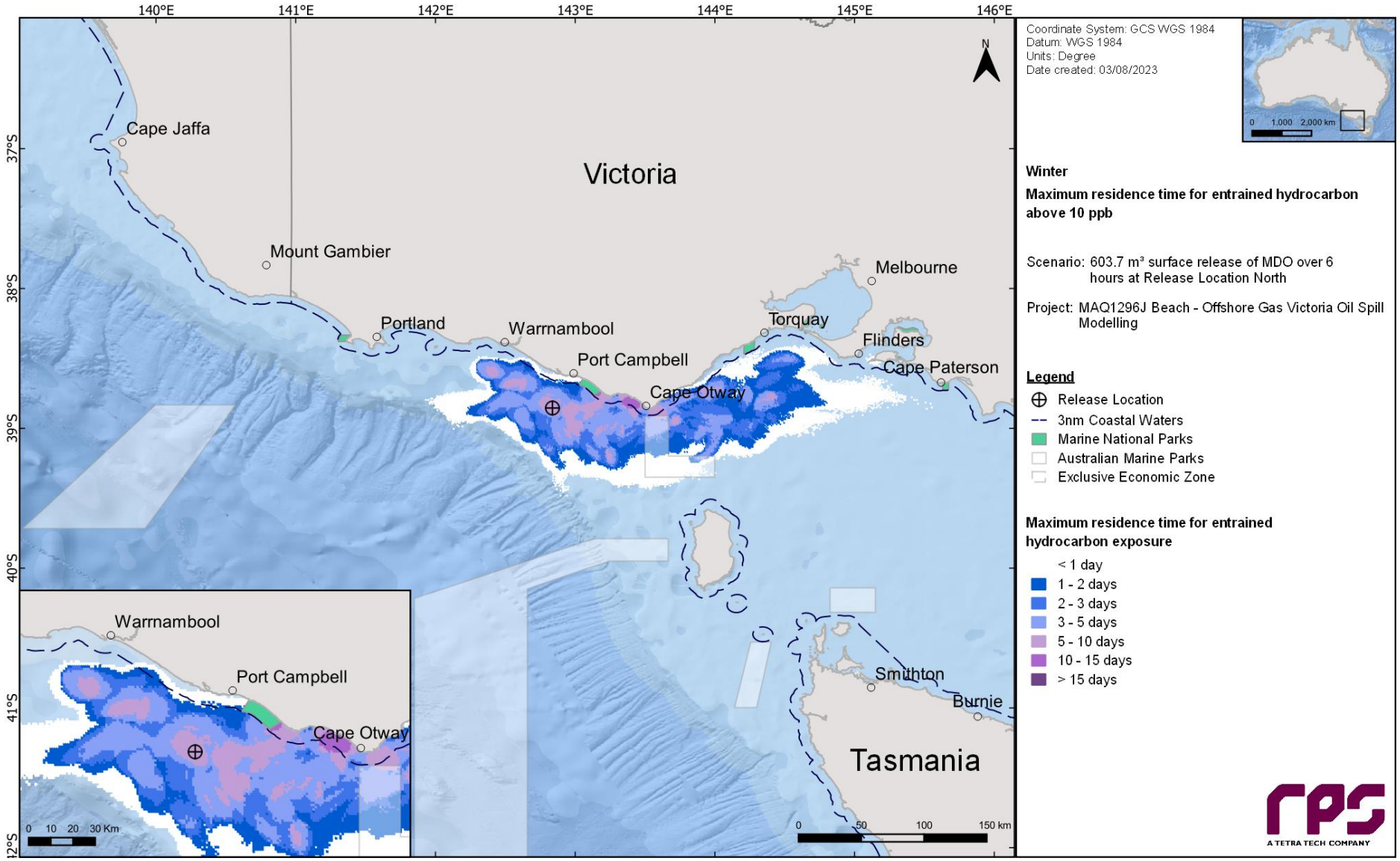

Figure 14-21 Maximum residence time for entrained hydrocarbon exposure above 10 ppb, at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations during winter conditions.

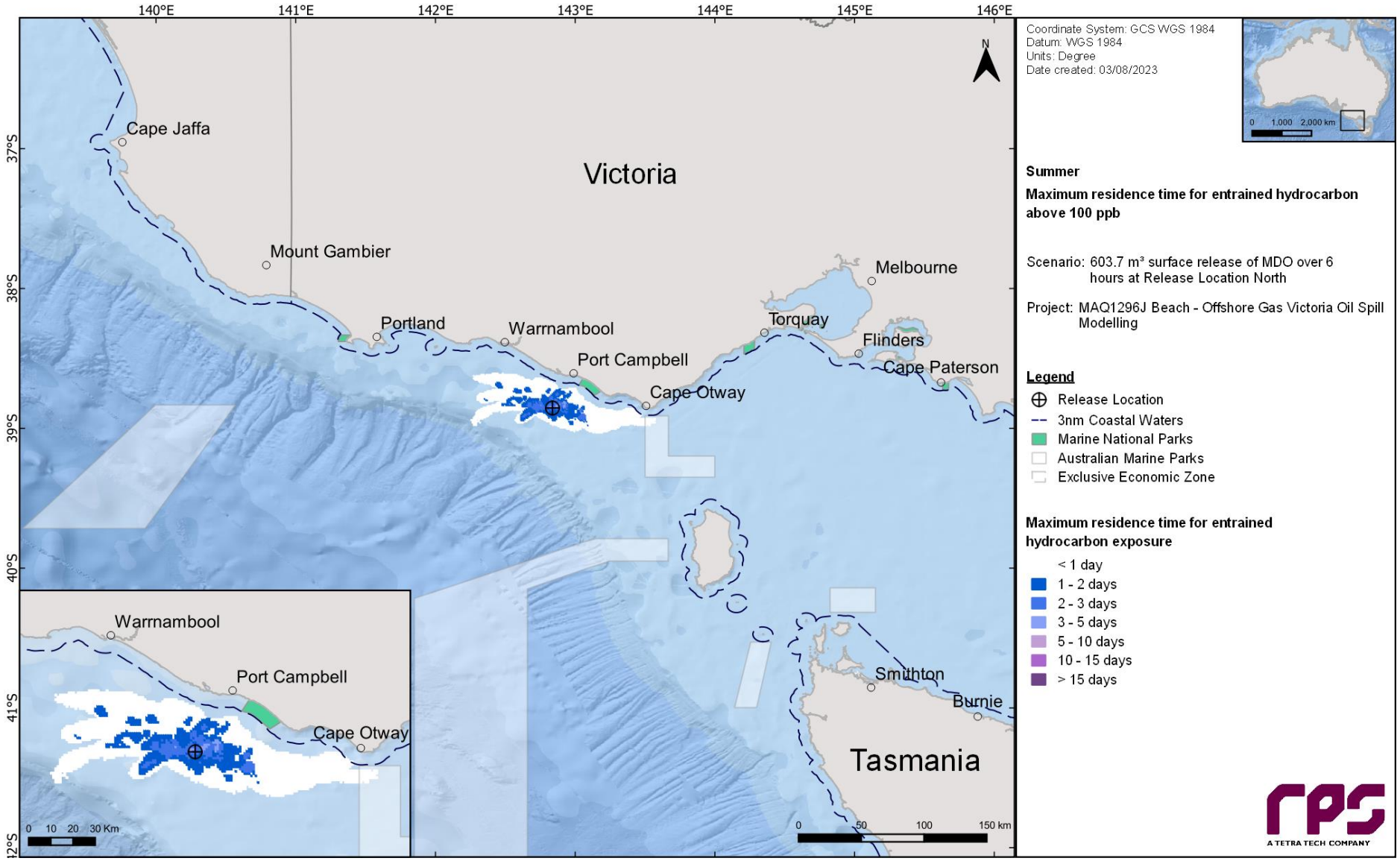

Figure 14-22 Maximum residence time for entrained hydrocarbon exposure above 100 ppb, at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations during summer conditions.

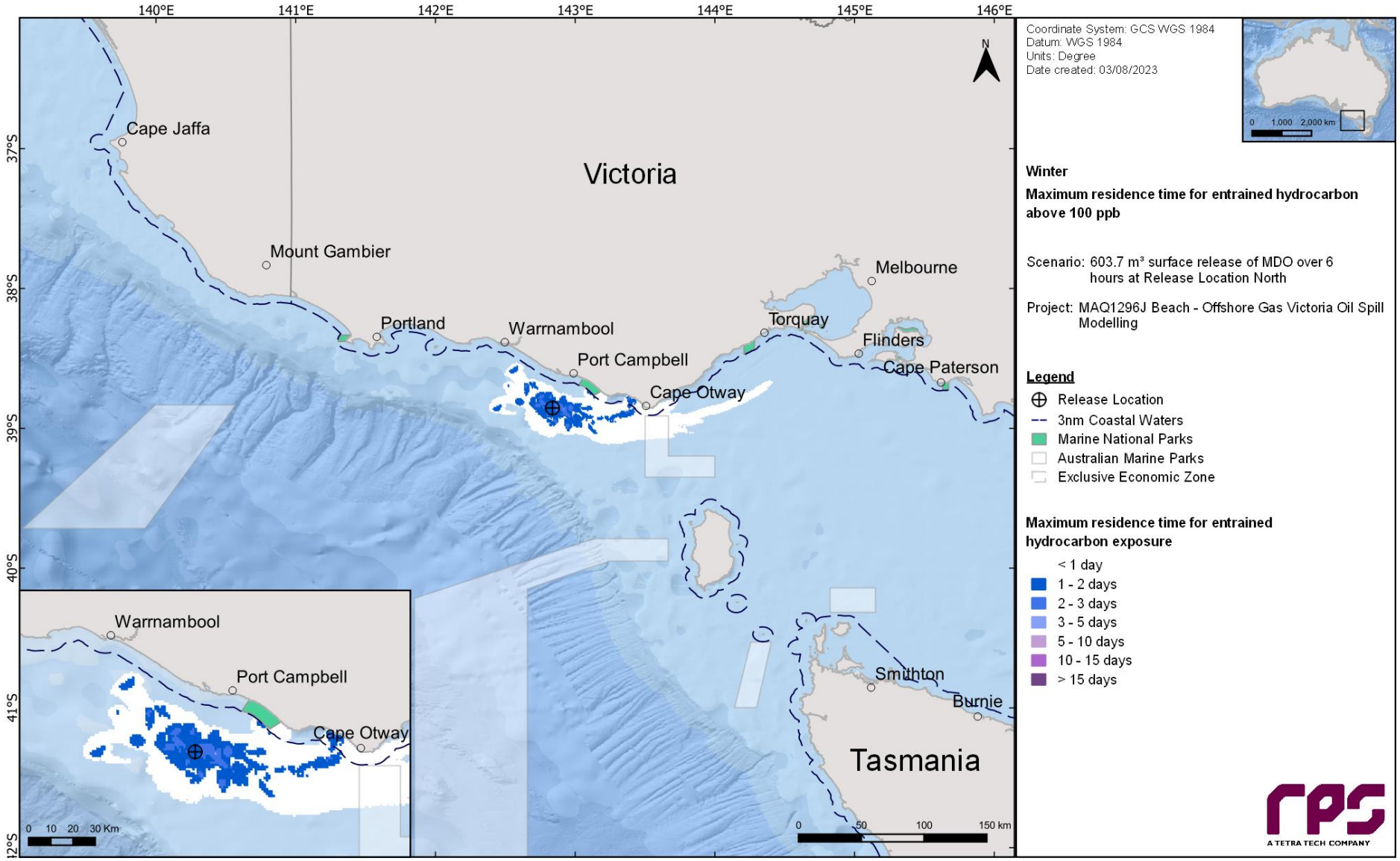

Figure 14-23 Maximum residence time for entrained hydrocarbon exposure above 100 ppb, at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel for a loss of containment from vessel collision at the Release Location North field. The results were calculated from 100 spill simulations during winter conditions.

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I.2 Otway Spill Modelling

BASS STRAIT

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TERMS AND ABBREVIATIONS

AMP	Australian Marine Park
AMSA	Australian Maritime Safety Authority
ANZECC	Australian and New Zealand Environment and Conservation Council
API	American Petroleum Institute gravity. A measure of how heavy or light a petroleum liquid is compared to water.
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
BIA	Biologically Important Areas
Bonn Agreement	An agreement for cooperation in dealing with pollution of the North Sea by oil and other harmful substances, 1983, includes: Governments of the Kingdom of Belgium, the Kingdom of Denmark, the French Republic, the Federal Republic of Germany, the Republic of Ireland, the Kingdom of the Netherlands, the Kingdom of Norway, the Kingdom of Sweden, the United Kingdom of Great Britain and Northern Ireland and the European Union.
BP	Boiling point. The temperature at which the vapor pressure of the liquid is equal to the pressure exerted on it by the surrounding atmosphere
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
Decay	The process where oil components are changed either chemically or biologically (biodegradation) to another compound. It includes breakdown to simpler organic carbon compounds by bacteria and other organisms, photo-oxidation by solar energy, and other chemical reactions.
Deterministic (single) oil spill modelling	Oil spill modelling involving a computer simulation of a single hypothetical oil spill event subject to a single sequence of wind, current and other sea conditions over time. Single oil spill modelling, also referred to as “deterministic modelling” provides a simulation of one possible outcome of a given spill scenario, subject to the metocean conditions that are imposed. Single oil spill modelling is commonly used to consider the fate and effects of ‘worst-case’ oil spill scenarios that are carefully selected in consideration of the nature and scale of the offshore petroleum activity and the local environment (NOPSEMA, 2017). Because the outcomes of a single oil spill simulation can only represent the outcome of that scenario under one sequence of metocean conditions, worst-case conditions are often identified from stochastic modelling. It is impossible to calculate the likelihood of any outcome from a single oil spill simulation. Single oil spill modelling is generally used for response planning, preparedness planning and for supporting oil spill response operations in the event of an actual spill
Dynamic viscosity	The dynamic viscosity of a fluid expresses its resistance to shearing flows, where adjacent layers move parallel to each other with different speeds.
Floating oil exposure	Contact by floating oil on the sea surface at concentrations equal to or exceeding defined threshold concentrations. The consequence will vary depending on the threshold and the receptors
HYCOM	Hybrid Coordinate Ocean Model. A data-assimilative, three-dimensional ocean model
HYDROMAP	Advanced ocean/coastal tidal model used to predict tidal water levels, current speed and current direction.
IMCRA	Integrated marine and coastal regionalisation areas
KEF	Key Ecological Feature
LGA	Local Government Areas
MAHs	Monoaromatic Hydrocarbons
MNP	Marine National Park
MP	Marine Park
MS	Marine Sanctuary
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
NP	National Park

NR	Nature Reserve
PAH	Polynuclear Aromatic Hydrocarbons
Pour Point	The pour point of a liquid is the temperature below which the liquid loses its flow characteristics
Ramsar site	A site listed under the Ramsar Convention on wetlands which is an international intergovernmental treaty that provides the framework for the conservation and wise use of wetlands and their resources.
RSB	Reefs, Shoals and Banks
Shoreline accumulation	Arrival of oil at or near shorelines at on-water concentrations equal to or exceeding defined threshold concentrations. Shoreline contact is judged for floating oil arriving within a 2 km buffer zone from any shoreline as a conservative measure
SIMAP	Spill Impact Model Application Package. SIMAP is designed to simulate the fate and effects of spilled hydrocarbons for surface or subsea releases
Stochastic (multiple) oil spill modelling	Stochastic oil spill modelling is created by overlaying and statistically analysing the outcomes of many single oil-spill simulations of a defined spill scenario, where each simulation was subject to a different sequence of metocean conditions, selected objectively (typically by random selection) from a long sequence of historic conditions for the study area. Analysis of this larger set of simulations provides a more accurate indication of the environment that maybe affected (EMBA) and indicates which locations are more likely to be affected (as well as other statistics). Stochastic oil spill modelling avoids biases that affect single oil spill modelling (due to the reliance on only one possible sequence of conditions). However, when interpreting stochastic modelling, which is based on a wide range of potential conditions that might happen to occur, it is essential to understand that calculations will encompass a much larger area than could be affected in any single spill event, where a more limited set of conditions will occur. Consequently, it is misleading to imply that the region derived from stochastic modelling indicate the outcomes expected from a single spill event (NOPSEMA, 2017) Stochastic modelling is generally used for risk assessment and preparedness planning by indicating locations that could be exposed and may require response or subsequent impact assessment
Sub-LGA	Sub-Local Government Areas
Shoreline accumulation	Arrival of oil at or near shorelines at on-water concentrations equal to or exceeding defined threshold concentrations.

EXECUTIVE SUMMARY

Background

Beach Energy Limited (Beach) plans exploration drilling within the Bass Strait. The location referred to as Bass 4 was selected as a representative location for assessment due to its location and potential flow rate for a loss of well control incident.

In order to support the Bass Strait EP, Beach commissioned a detailed oil spill modelling study assessing the following hypothetical scenarios:

- A 1,177,496.54 bbl (~187,207 m^3) release of condensate from 60 m depth over a period of 86 days following loss of well control;
- A 603.7 m^3 surface release of marine diesel over 6 hours following a loss of containment from a vessel.

The modelling assessment was undertaken on a seasonal basis as follows:

- Summer (November through to March); and
- Winter (April to October)

The purpose of the modelling is to provide an understanding of a conservative 'outer envelope' of the potential area that may be affected in the unlikely event of hydrocarbon spill. The modelling does not take into consideration any of the spill prevention, mitigation and response strategies that would be implemented in response to a spill. Therefore, the modelling results represent the maximum extent that the released hydrocarbon may influence.

The spill modelling was performed using an advanced three-dimensional trajectory and fates model; Spill Impact Model Application Program (SIMAP). The SIMAP model calculates the transport, spreading, entrainment and evaporation of spilled hydrocarbons over time, based on the prevailing wind and current conditions and the physical and chemical properties.

Methodology

The modelling study was carried out in several stages. Firstly, a 10-year wind and current dataset (2010–2019) was generated and the currents included the combined influence of three-dimensional large-scale ocean currents and tidal currents. Secondly, the currents, winds and detailed hydrocarbon characteristics were used as inputs in the three-dimensional oil spill model (SIMAP) to simulate the drift, spread, weathering and fate of the spilled hydrocarbons.

As spills can occur during any set of wind and current conditions, modelling was conducted using a stochastic (random or non-deterministic) approach, which involved running 100 randomly selected single trajectory simulations per season, with each simulation having the same spill information (spill volume, duration and composition of hydrocarbons) but varying start times. This ensured that each spill simulation was subject to a unique set of wind and current conditions.

The SIMAP system, the methods and analysis presented herein, use modelling algorithms which have been anonymously peer reviewed and published in international journals. Further, RPS warrants that this work meets and exceeds the ASTM Standard F2067-13 "*Standard Practice for Development and Use of Oil Spill Models*".

Oil Properties

Trefoil condensate has an API of 46.7 and a density of 794.1 kg/m^3 (at 15ºC) and a low viscosity value of 0.14 cP, classifying it as a Group II (light-persistent) oil according to the International Tankers Owners Pollution Federation (ITOPF, 2014) and US EPA/USCG classifications. When on the sea surface and under weaker winds, about 41.9% should evaporate within the first 12 hours (BP < 180°C); a further 30.2% should evaporate within the first 24 hours (180°C < BP < 160°C); and a further 16.95% should evaporate over several days (160°C < BP < 380°C). Approximately 11% of the condensate is shown to be persistent, which shall not evaporate, though will decay over time.

Marine diesel (MDO) has an API of 37.6 and a density of 829.1 kg/m^3 (at 25ºC) with a viscosity value (4.0 cP) classifying it as a Group II (light-persistent) oil according to the International Tankers Owners Pollution Federation (ITOPF, 2014) and US EPA/USCG classifications.

The MDO is a mixture of volatile and persistent hydrocarbons with high proportions of volatile and semi- to low-volatile components. In favourable evaporation conditions, about 6.0% of the oil mass should evaporate within the first 12 hours (BP < 180°C); a further 34.6% should evaporate within the first 24 hours (180°C < BP < 265°C); and a further 54.4% should evaporate over several days (265°C < BP < 380°C). Approximately 5.0% of the oil is shown to be persistent.

Results

Scenario: 86-day Loss of Well Control at Bass 4

- The maximum distance from the release location to the low (1–10 g/m^2), moderate (10–50 g/m^2) and high (>50 g/m^2) exposure zones was 307 km (south), 88 km (southwest) and 17 km (north-northwest) all during winter conditions, respectively.
- Outside of the receptors that the Bass 4 release location resides within, the Boags AMP revealed the highest probabilities (98% summer and 83% winter) of having floating oil reaching it at the low threshold.
- The probability of accumulation to any shoreline at, or above, the low level (10 g/m^2) threshold was 89% during summer conditions and 85% during winter conditions.
- Hunter Island recorded the highest probability of shoreline accumulation at the low threshold during summer, with 57% and Kent Island Group during winter, with 60%.
- The maximum volume ashore for a single spill trajectory during both seasons was 50 m^3, whilst the maximum length of shoreline accumulation at the low threshold was 105 km and 112 km for summer and winter, respectively.
- Outside of the receptors that the Bass 4 release location resides within, the highest concentration of dissolved hydrocarbon was predicted for the Boags AMP (1,392 ppb – summer, 1,157 ppb – winter), which also revealed 100% probability of low dissolved hydrocarbon exposure in both seasons; and
- Outside of the receptors that the Bass 4 release location resides within, the highest concentration of entrained hydrocarbon was predicted for Boags AMP (summer –,1,758 ppb, winter – 1,360 ppb). The same receptor, along with Pygmy Blue Whale - Known Foraging Area BIA also presented the highest probabilities of low entrained hydrocarbon exposure (100% in both seasons).

Scenario: Loss of Marine Diesel Containment at Bass 4

- The maximum distance from the release location to the low (1–10 g/m^2), moderate (10–50 g/m^2) and high (> 50g/ m^2) exposure zones was 42 km (west-southwest) during winter conditions, and 25 km (west-southwest) during summer conditions and 11 km (west) during winter conditions respectively.
- Outside of the receptors that the Bass 4 release location resides within, floating oil exposure above the low threshold was predicted at the Boags AMP (1% summer and 2% winter) and the Pygmy Blue Whale - Known Foraging Area BIA (1% winter).
- The probability of accumulation to any shoreline at, or above, the low level (10 g/m^2) threshold was 11% during summer conditions and 3% during winter conditions.
- The maximum volume ashore for a single spill trajectory during the summer and winter conditions was 3 m^3 and 6 m^3, respectively, whilst the maximum length of shoreline accumulation at the low threshold was 6 km and 10 km, respectively.

- Outside of the receptors that the Bellerive release location resides within (refer to Table 10-2), the highest concentration of dissolved hydrocarbon was predicted for the Boags AMP (summer – 53 ppb, winter – 36 ppb), which also revealed the highest probability of low dissolved hydrocarbon exposure (summer – 4%, winter – 3%); and
- Outside of the receptors that the Bass 4 release location resides within, the highest concentration of entrained hydrocarbon was predicted for Boags AMP (summer – 695 ppb, winter – 623 ppb). The same receptor recorded the highest probability of low entrained hydrocarbon exposure (47% summer and 28% winter).

1 INTRODUCTION

1.1 Background

Beach Energy Limited (Beach) plans exploration drilling within the Bass Strait. The location referred to as Bass 4 was selected as a representative location for assessment due to its location and potential flow rate for a loss of well control incident.

In order to support the Bass Strait EP, Beach commissioned a detailed oil spill modelling study assessing the following hypothetical scenarios:

- A 1,177,496.54 bbl (~187,207 m^3) release of condensate at 60 m depth over a period of 86 days following loss of well control.
- A 603.7 m^3 surface release of marine diesel over 6 hours following a loss of containment from vessel collision.

The modelling assessment was undertaken on a seasonal basis as follows:

- Summer (November through to March); and
- Winter (April to October)

The purpose of the modelling is to provide an understanding of a conservative 'outer envelope' of the potential area that may be affected in the unlikely event of hydrocarbon spill. The modelling does not take into consideration any of the spill prevention, mitigation and response strategies that would be implemented in response to a spill. Therefore, the modelling results represent the maximum extent that the released hydrocarbon may influence.

The spill modelling was performed using an advanced three-dimensional trajectory and fates model; Spill Impact Model Application Program (SIMAP). The SIMAP model calculates the transport, spreading, entrainment and evaporation of spilled hydrocarbons over time, based on the prevailing wind and current conditions and the physical and chemical properties.

Table 1-1 Location of assessed release sites.

Well	Latitude	Longitude
Bass 4	39.99654° S	145.27730° E

GCS: WGS84

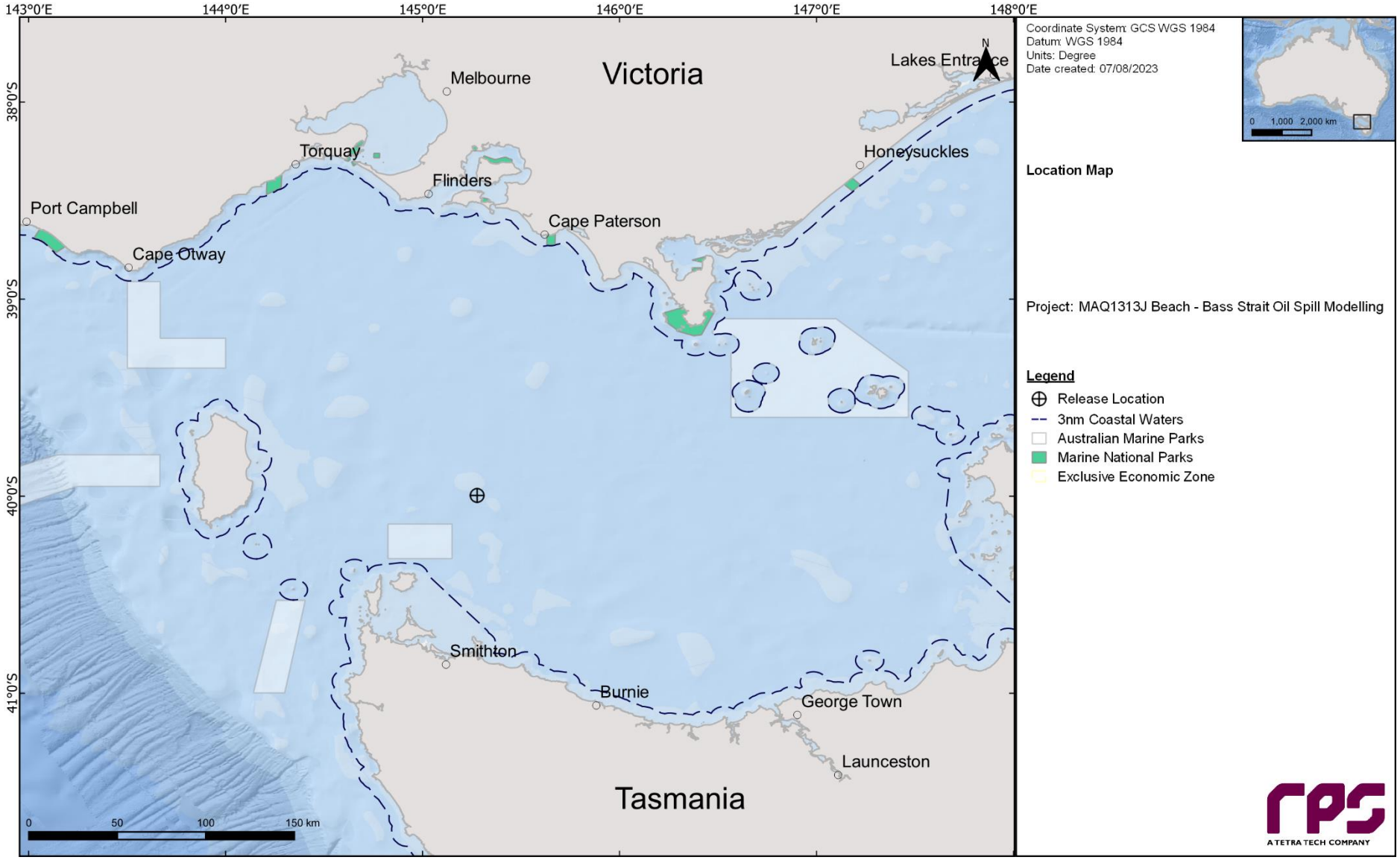

Figure 1-1 Map of the assessed release location.

1.2 What is Oil Spill Modelling?

Oil spill modelling is a valuable tool widely used for risk assessment, emergency response and contingency planning where it can be particularly helpful to proponents and decision makers. By modelling a series of the most likely oil spill scenarios, decisions concerning suitable response measures and strategic locations for deploying equipment and materials can be made, and the locations at most risk can be identified. The two types of oil spill modelling often used are stochastic (Section 1.2.1) and deterministic (Section 1.2.2) modelling.

1.2.1 Stochastic Modelling (Multiple Spill Simulations)

Stochastic oil spill modelling is created by overlaying a great number (often hundreds) of individual, computer-simulated hypothetical spills (NOPSEMA, 2018; Figure 1.2).

Stochastic modelling is a common means of assessing the potential risks from oil spills related to new projects and facilities. Stochastic modelling typically utilises hydrodynamic data for the location in combination with historic wind data. Typically, 100 iterations of the model will be run utilising the data that is most relevant to the season or timing of the project.

The outcomes are often presented as a probability of exposure and is primarily used for risk assessment purposes in view to understand the range of environments that may be affected or impacted by a spill. Elements of the stochastic modelling can also be used in oil spill preparedness and planning.

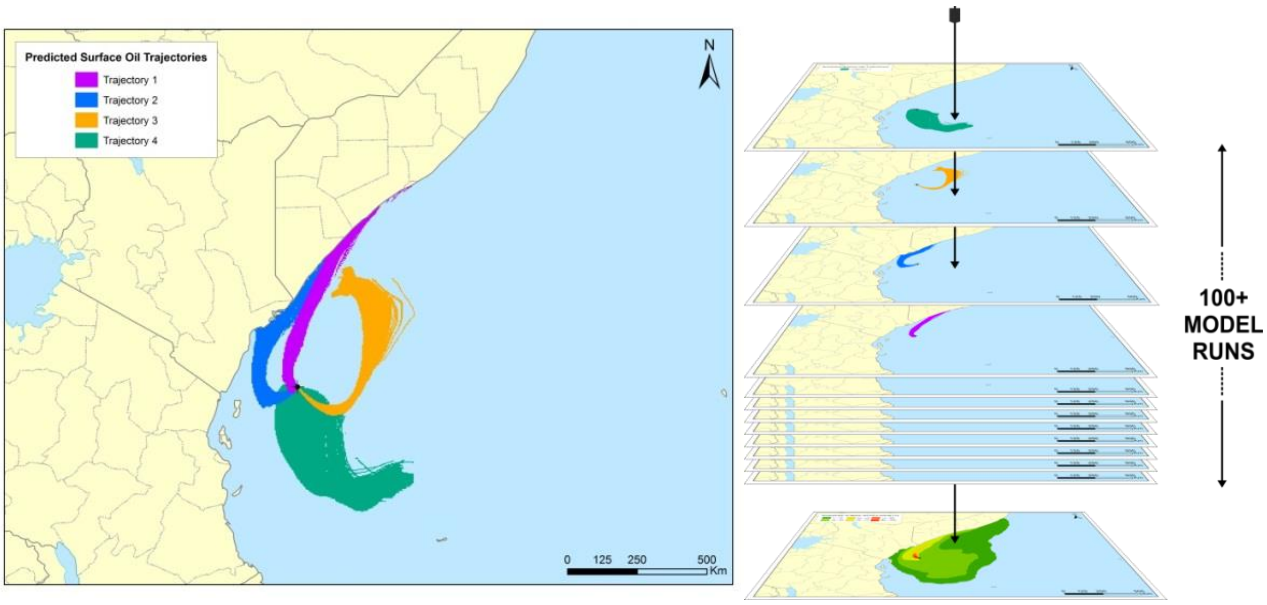

Figure 1-2 Examples of four individual spill trajectories (four replicate simulations) predicted by SIMAP for a spill scenario. The frequency of contact with given locations is used to calculate the probability of impacts during a spill. Essentially, all model runs are overlain (shown as the stacked runs on the right) and the number of times that trajectories contact a given location at a concentration is used to calculate the probability.

1.2.2 Deterministic Modelling (Single Spill Simulation)

Deterministic modelling is the predictive modelling of a single incident subject to a single sample of wind and weather conditions over time (NOPSEMA, 2018; Figure 1-3).

Deterministic modelling is often paired with stochastic modelling to place the large stochastic footprint into perspective. This deterministic analysis is generally a single run selected from the stochastic analysis and serves as the basis for developing the plans and equipment needs for a realistic spill response. Deterministic spills can be selected on several basis such as minimum time to shoreline, largest swept area, maximum volume ashore, longest length of shoreline contacted by oil or largest area of entrained or dissolved hydrocarbons.

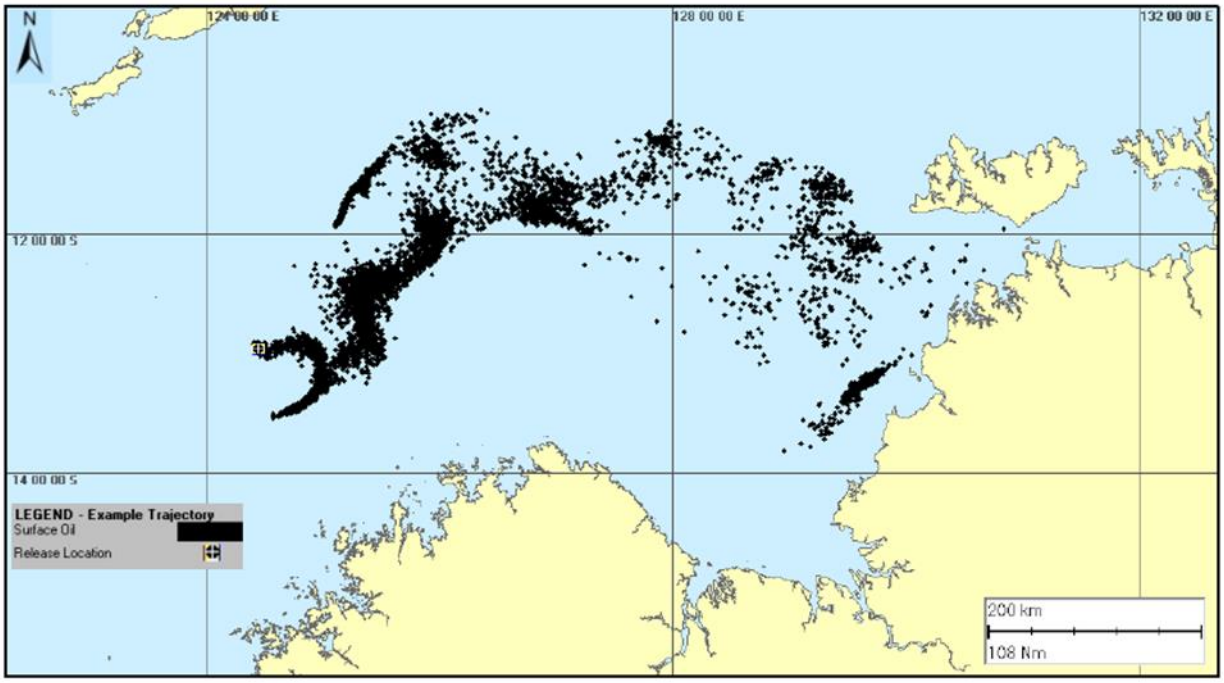

Figure 1-3 Example of an individual spill trajectory predicted by SIMAP for a spill scenario. Note, this image represents surface oil as spillets and do not take any thresholds into consideration.

2 SCOPE OF WORK

The scope of work included the following components:

- Generate 10-years of winds and three-dimensional currents from 2010 to 2019 (inclusive). The currents included the combined influence of tidal and ocean currents.
- Include the wind and current data and characteristics of the released hydrocarbons as input into the three-dimensional oil spill model (SIMAP), to model the movement, spreading, weathering and shoreline contact by hydrocarbons over time.
- Use SIMAP's stochastic model (also known as a probability model) to calculate exposure to surrounding waters and shorelines. This involved running 100 randomly selected single trajectory simulations per season, with each simulation having the same spill information (spill volume, duration and composition of hydrocarbons) but varying start times. This ensured that each spill simulation was subject to a unique set of wind and current conditions.
- Results were assessed to determine the exposure to waters and contact to shorelines based upon the NOPSEMA thresholds; and

3 REGIONAL CURRENTS

Bass Strait is a body of water separating Tasmania from the southern Australian mainland, specifically the state of Victoria. The strait is a relatively shallow area of the continental shelf, connecting the southeast Indian Ocean with the Tasman Sea. Currents within the straight are primarily driven by tides, winds, incident continental shelf waves and density driven flows; high winds and strong tidal currents are frequent within the area (Jones, 1980).

The varied geography and bathymetry of the region, in addition to the forcing of the south-eastern Indian Ocean and local meteorology lead to complex shelf and slope circulation patterns (Middleton & Bye, 2007). Figure 3-1 displays seasonal current trends within the Bass Strait. During winter there is a strong eastward water flow due to the strengthening of the South Australian Current (fed by the Leeuwin Current in the Northwest Shelf), which bifurcates with one extension moving though the Bass Strait, and another forming the Zeehan Current off western Tasmania (Sandery & Kämpf, 2007). During summer, water flow reverses off Tasmania, King Island and the Otway Basin travelling eastward, as the coastal current develops due to south-easterly winds.

To accurately describe the variability in currents between the inshore and offshore region, a hybrid regional dataset was developed by combining deep ocean predictions obtained from HYCOM (Hybrid Coordinate Ocean Model) with surface tidal currents developed by RPS. The following sections provide a summary of the hybrid regional dataset.

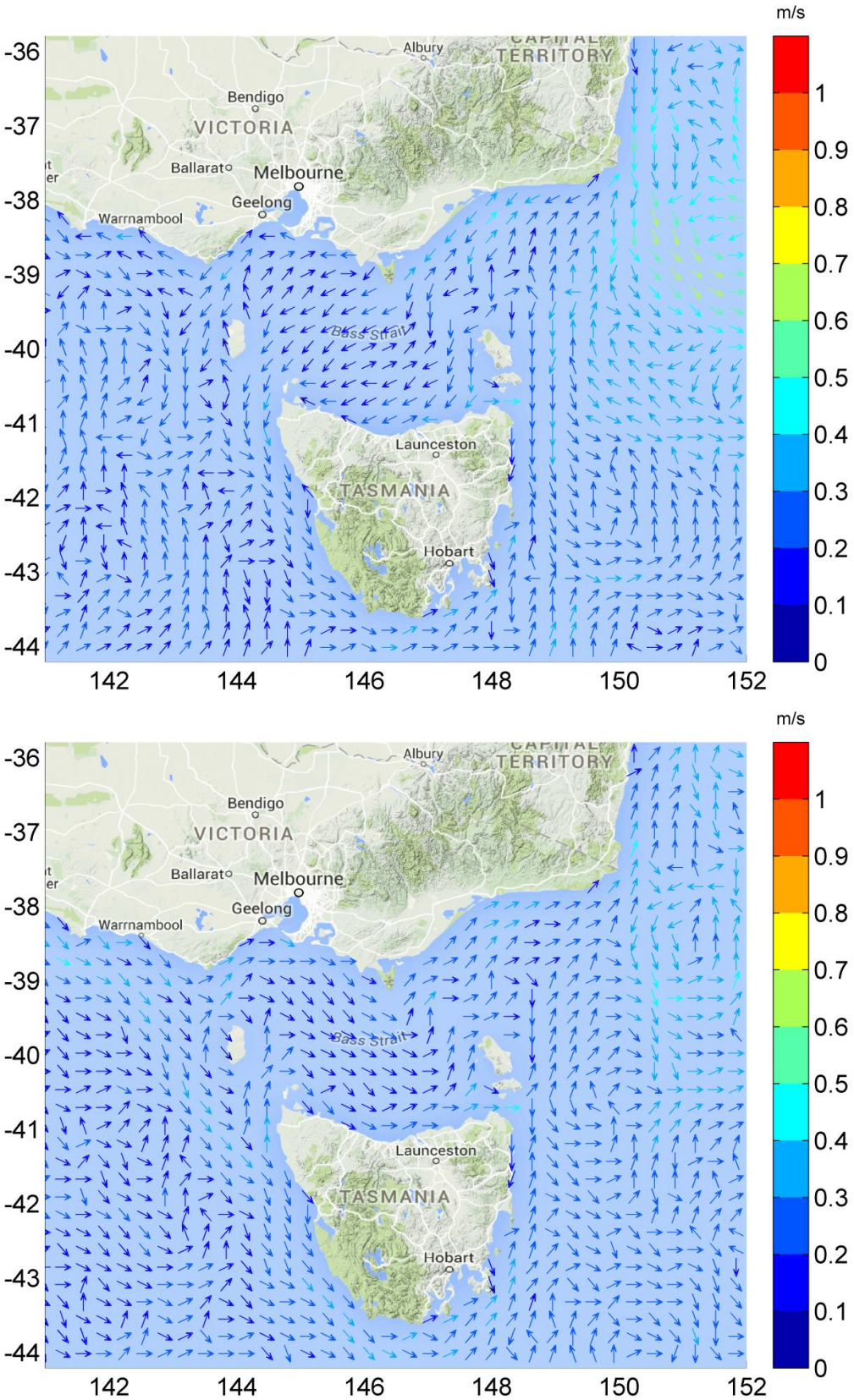

Figure 3-1 **HYCOM averaged seasonal surface drift currents during summer (upper image) and winter (lower image).**

3.1 Tidal Current Model

Tidal current data was generated using RPS's advanced ocean/coastal model, HYDROMAP. The HYDROMAP model has been thoroughly tested and verified through field measurements throughout the world for more than 30 years (Isaji & Spaulding, 1984; Isaji, et al., 2001; Zigic, et al., 2003). HYDROMAP tidal current data has been used as input to forecast (in the future) and hindcast (in the past) pollutant spills in Australian waters and forms part of the Australian National Oil Spill Emergency Response System operated by AMSA (Australian Maritime Safety Authority).

HYDROMAP employs a sophisticated sub-gridding strategy, which supports up to six levels of spatial resolution, halving the grid cell size as each level of resolution is employed. The sub-gridding allows for higher resolution of currents within areas of greater bathymetric and coastline complexity, and/or of interest to a study.

The numerical solution methodology follows that of Davies (1977a and 1977b) with further developments for model efficiency by Owen (1980) and Gordon (1982). A more detailed presentation of the model can be found in Isaji and Spaulding (1984) and Isaji et al. (2001).

3.1.1 Grid Setup

The tidal model domain is sub-gridded to a resolution of 500 m for shallow and coastal regions, starting from an offshore (or deep water) resolution of 8 km. The finer grids are progressively allocated in a step-wise fashion to more accurately resolve flows along the coastline, around islands and over regions with more complex bathymetry. Figure 3-2 shows the tidal model grid covering the study domain.

A combination of datasets was used and merged to describe the shape of the seabed within the grid domain (Figure 3-3). These included spot depths and contours which were digitised from nautical charts released by the hydrographic offices as well as Geoscience Australia database and depths extracted from the Shuttle Radar Topography Mission (SRTM30_PLUS) Plus dataset (see Becker et al., 2009).

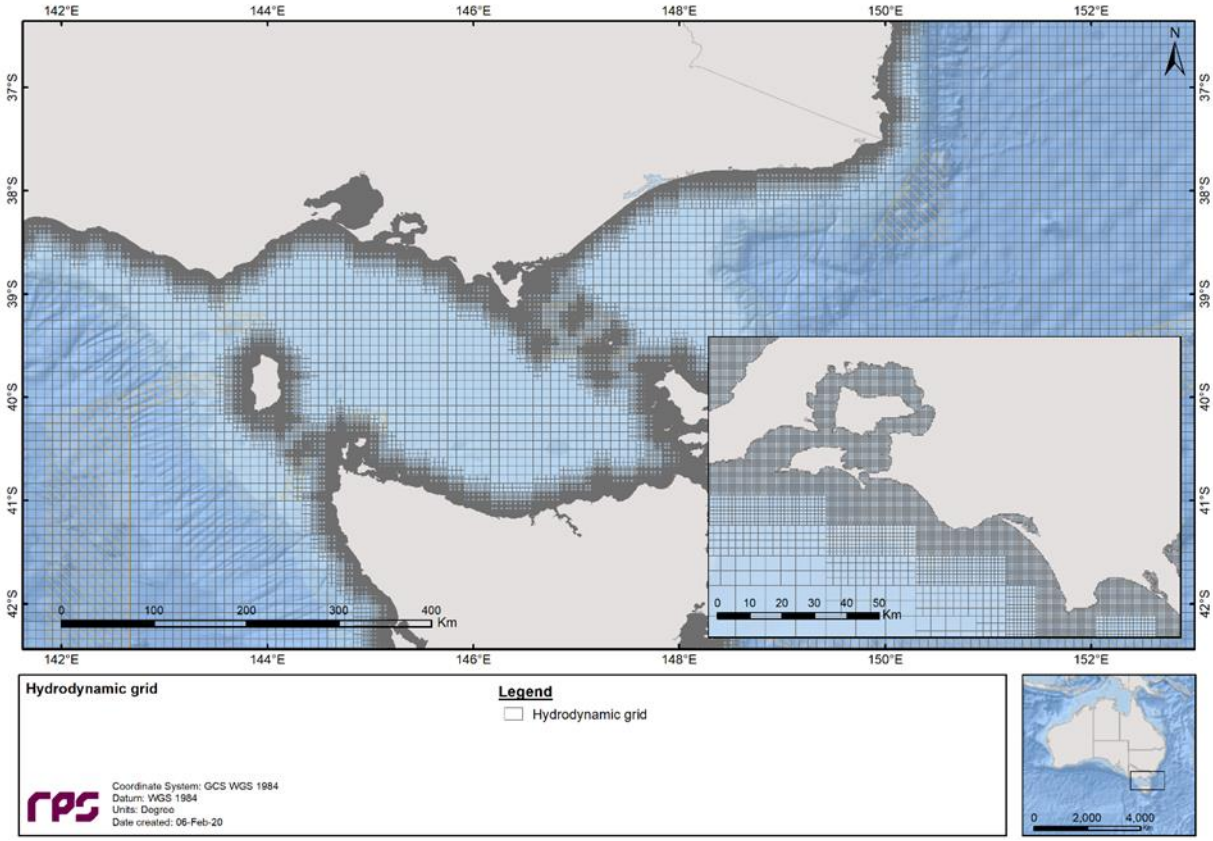

Figure 3-2 Sample of the model grid used to generate the tidal currents for the study region. Higher resolution areas are shown by the denser mesh.

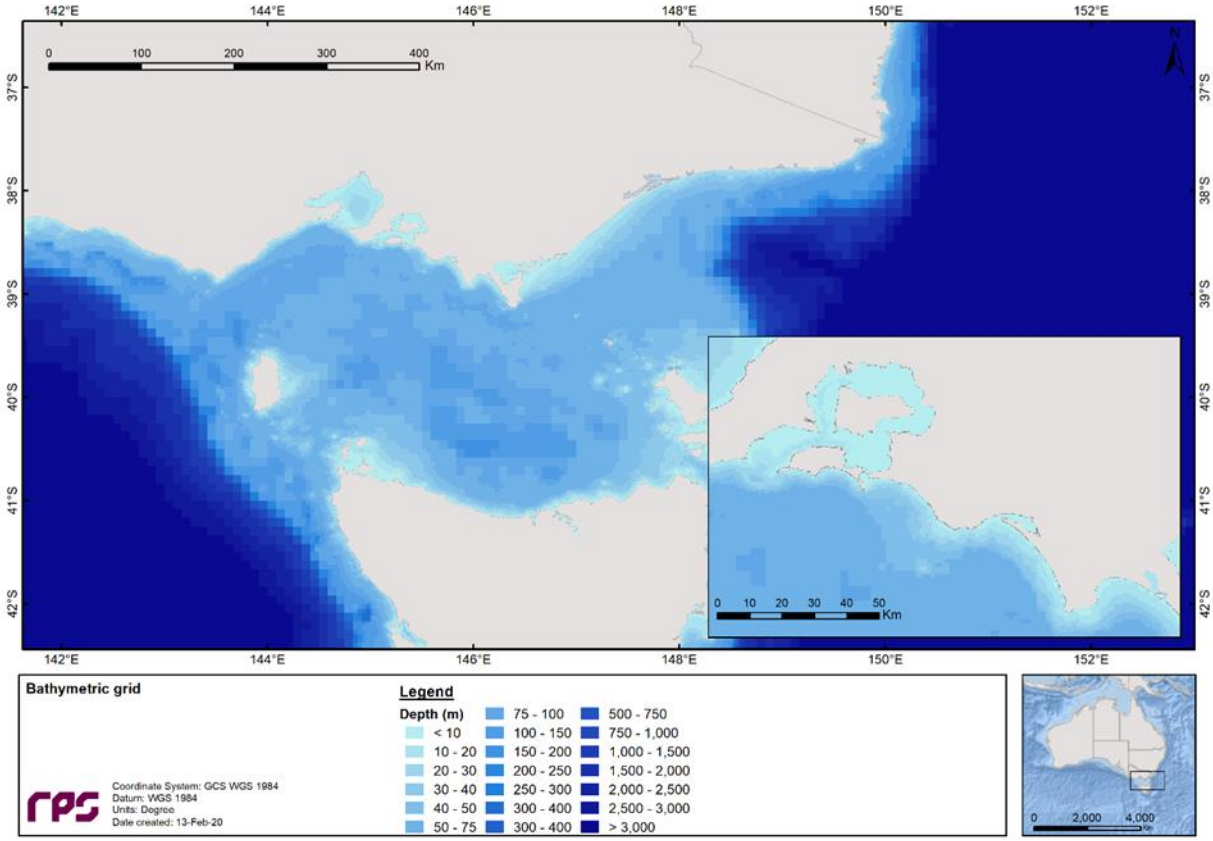

Figure 3-3 Bathymetry defined throughout the tidal model domain.

3.1.2 Tidal Conditions

The ocean boundary data for the regional model was obtained from satellite measured altimetry data (TOPEX/Poseidon 8.0) which provided estimates of the eight dominant tidal constituents at a horizontal scale of approximately 0.25 degrees. The eight major tidal constituents used were K_2, S_2, M_2, N_2, K_1, P_1, O_1 and Q_1. Using the tidal data, time series surface heights were calculated along the open boundaries for the simulation period.

The Topex/Poseidon satellite data has a resolution of 0.25 degrees globally, with higher resolution in coastal regions, and is produced and quality controlled by NASA (National Aeronautics and Space Administration). The data capturing satellites, equipped with two altimeters capable of taking sea level measurements accurate to less than ± 5 cm, measured oceanic surface elevations (and the resultant tides) for the period 1992–2005. In total these satellites carried out 62,000 orbits of the planet. The Topex/Poseidon tidal data has been widely used amongst the oceanographic community, being referenced in more than 2,100 research publications (e.g. Andersen, 1995; Ludicone et al., 1998; Matsumoto et al., 2000; Kostianoy et al., 2003; Yaremchuk & Tangdong, 2004; Qiu & Chen 2010). The Topex/Poseidon tidal data is considered suitably accurate for this study.

3.1.3 Surface Elevation Validation

To ensure that tidal predictions were accurate, predicted surface elevations were compared to data observed at a location situated within the study area (Figure 3-4).

To provide a statistical measure of the model performance, the Index of Agreement (IOA – Willmott, 1981) and the Mean Absolute Error (MAE – Willmott, 1982; Willmott & Matsuura, 2005) were used.

The MAE (Eq.1) is simply the average of the absolute values of the difference between the model-predicted (P) and observed (O) variables. It is a more natural measure of the average error (Willmott and Matsuura, 2005) and more readily understood. The MAE is determined by:

$$MAE = N^{-1} \sum_{i=1}^{N} |P_i - O_i| \qquad \text{Eq.1}$$

Where: N = Number of observations

P_i = Model predicted surface elevation

O_i = Observed surface elevation

The Index of Agreement (IOA; Eq. 2) in contrast, gives a non-dimensional measure of model accuracy or performance. A perfect agreement between the model predicted and observed surface elevations exists if the index gives an agreement value of 1, and complete disagreement between model and observed surface elevations will produce an index measure of 0 (Wilmott, 1981). Willmott et al. (1985) also suggests that values larger than 0.5 may represent good model performance. The IOA is determined by:

$$IOA = 1 - \frac{\sum |X_{model} - X_{obs}|^2}{\sum (|X_{model} - \overline{X_{obs}}| + |X_{obs} - \overline{X_{obs}}|)^2} \qquad \text{Eq.2}$$

Where: X_{model} = Model predicted surface elevation

X_{obs} = Observed surface elevation

Clearly, a greater IOA and lower MAE represent a better model performance.

Figure 3-5 and Figure 3-6 illustrate a comparison of the predicted and observed surface elevations in February 2017. As shown on the graph, the model accurately reproduced the phase and amplitudes throughout the spring and neap tidal cycles.

Table 3-1 shows the IOA and MAE values for the selected tide station locations indicating that the model is performing well.

Table 3-1 Statistical comparison between the observed and HYDROMAP predicted surface elevations.

Tide Station	IOA	MAE (m)
Gabo Island	0.98	0.08
Port MacDonnell	0.98	0.05
Port Welshpool	0.92	0.30
Portland	0.97	0.07
Stack Island	0.96	0.22

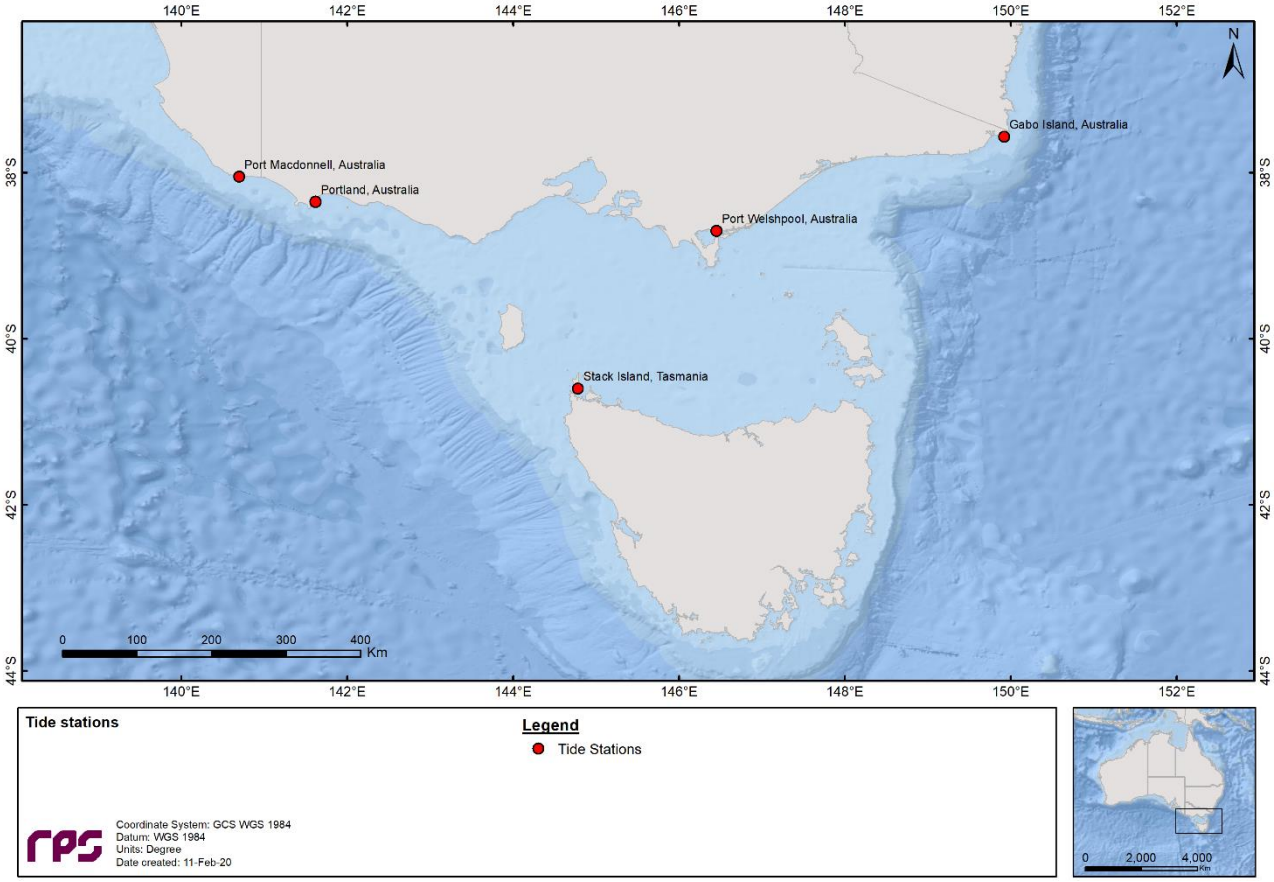

Figure 3-4 Location of the tide stations used in the surface elevation validation.

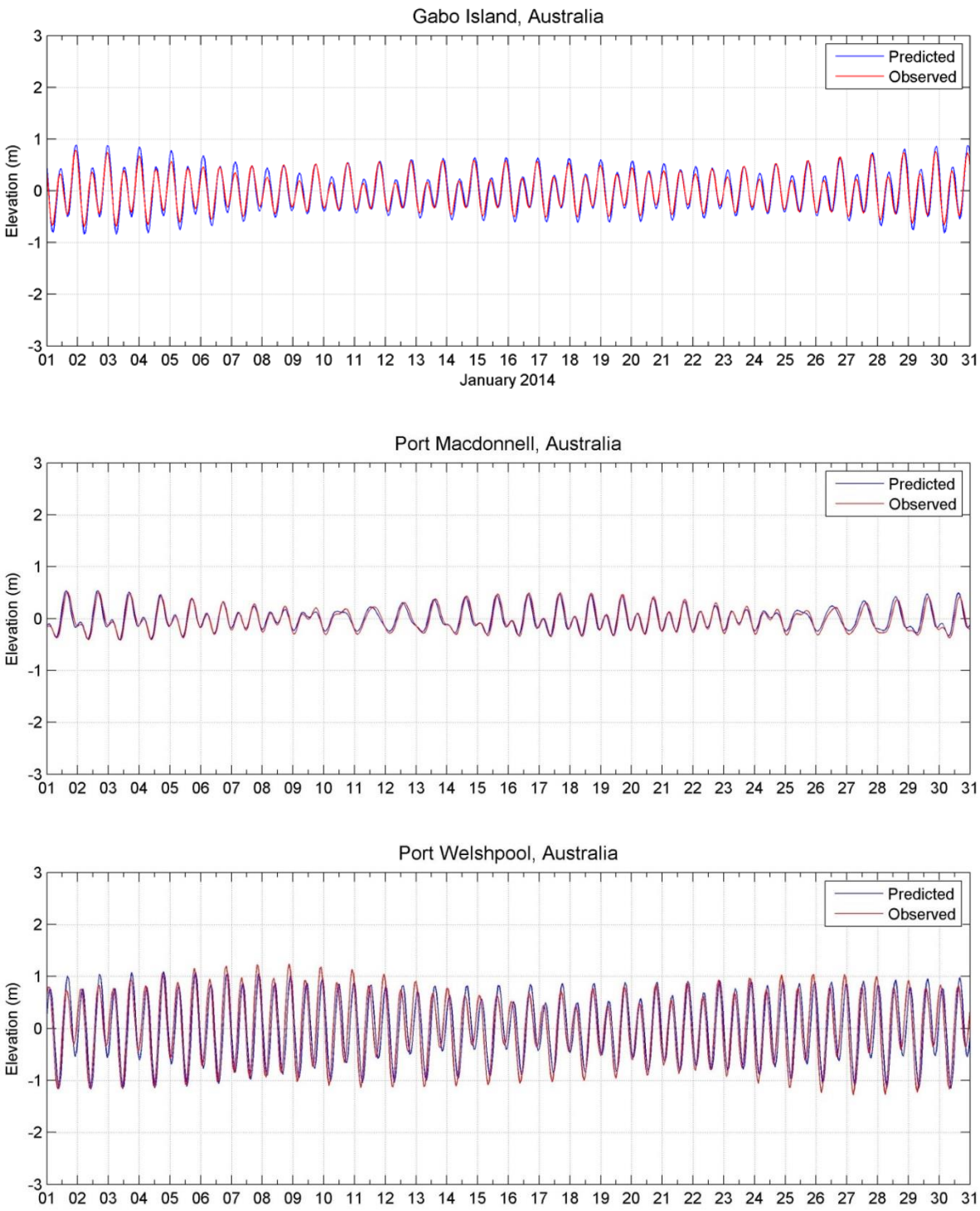

Figure 3-5 Comparison between HYDROMAP predicted (blue line) and observed (red line) surface elevation at tidal stations Gabo Island (upper image), Port MacDonnell (middle image) and Port Welshpool (lower image).

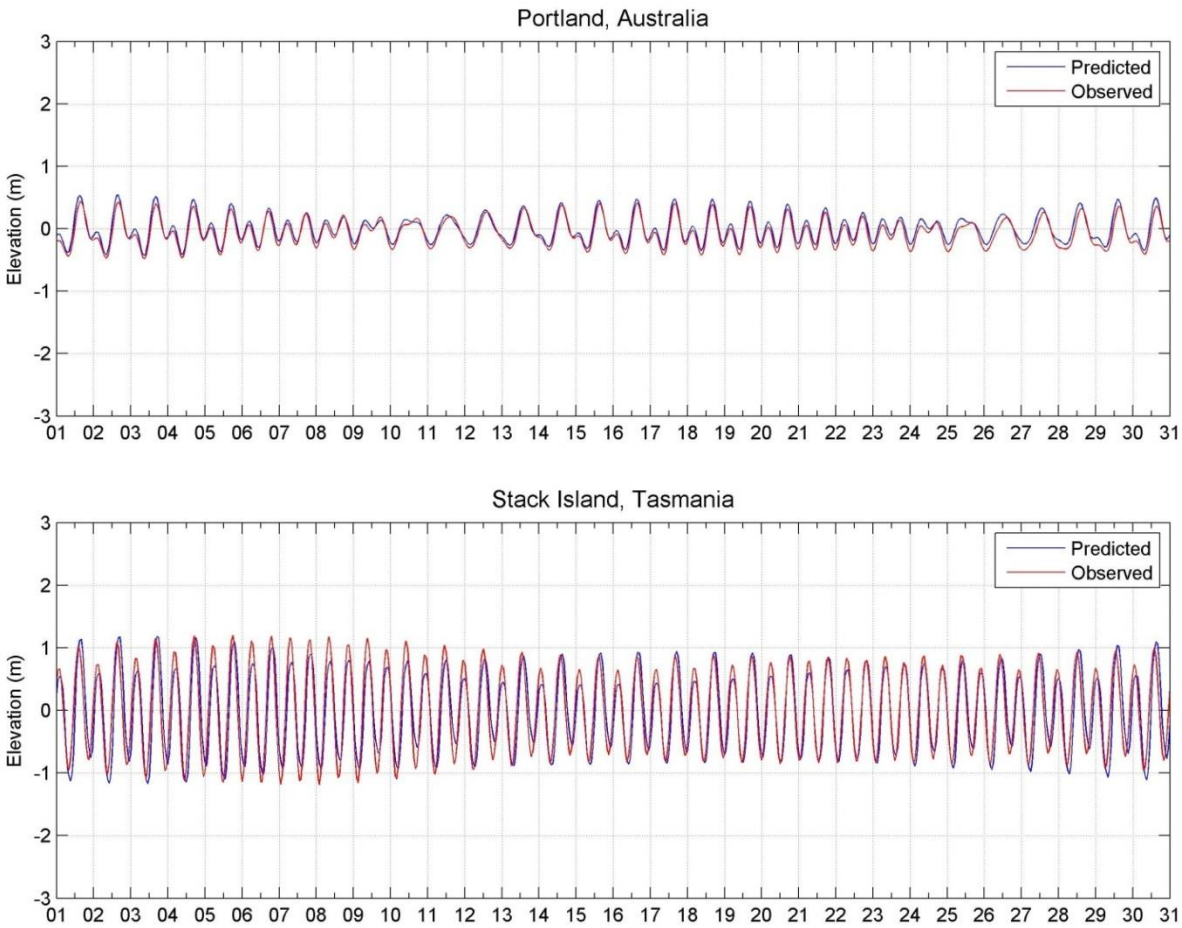

Figure 3-6 Comparison between HYDROMAP predicted (blue line) and observed (red line) surface elevation at tidal stations Portland (upper image) and Stack Island (lower image).

3.2 Ocean Current Model

Data describing the flow of ocean currents for the years 2010 to 2019 (inclusive) was obtained from HYCOM (Hybrid Coordinate Ocean Model, (Chassignet et al., 2007), which is operated by the HYCOM Consortium, sponsored by the Global Ocean Data Assimilation Experiment (GODAE). HYCOM is a data-assimilative, three-dimensional ocean model that is run as a hindcast (for a past period), assimilating time-varying observations of sea surface height, sea surface temperature and in-situ temperature and salinity measurements (Chassignet et al., 2009). The HYCOM predictions for drift currents are produced at a horizontal spatial resolution of approximately 8.25 km (1/12th of a degree) over the region, at a frequency of every 3 hours. HYCOM uses isopycnal layers in the open, stratified ocean, but uses the layered continuity equation to make a dynamically smooth transition to a terrain-following coordinate in shallow coastal regions, and to z-level coordinates in the mixed layer and/or unstratified seas.

3.3 Surface Currents

Table 3-2 presents the monthly average and maximum net surface current speeds nearby the Bass 4 release location by combining the ocean and tidal currents. Current speeds varied throughout the year with monthly maximum current speeds ranging between 0.89 m/s (February) and 1.38 m/s (July). The dominant surface current directions throughout the year were identified as (towards) was northeast.

Figure 3-7 and

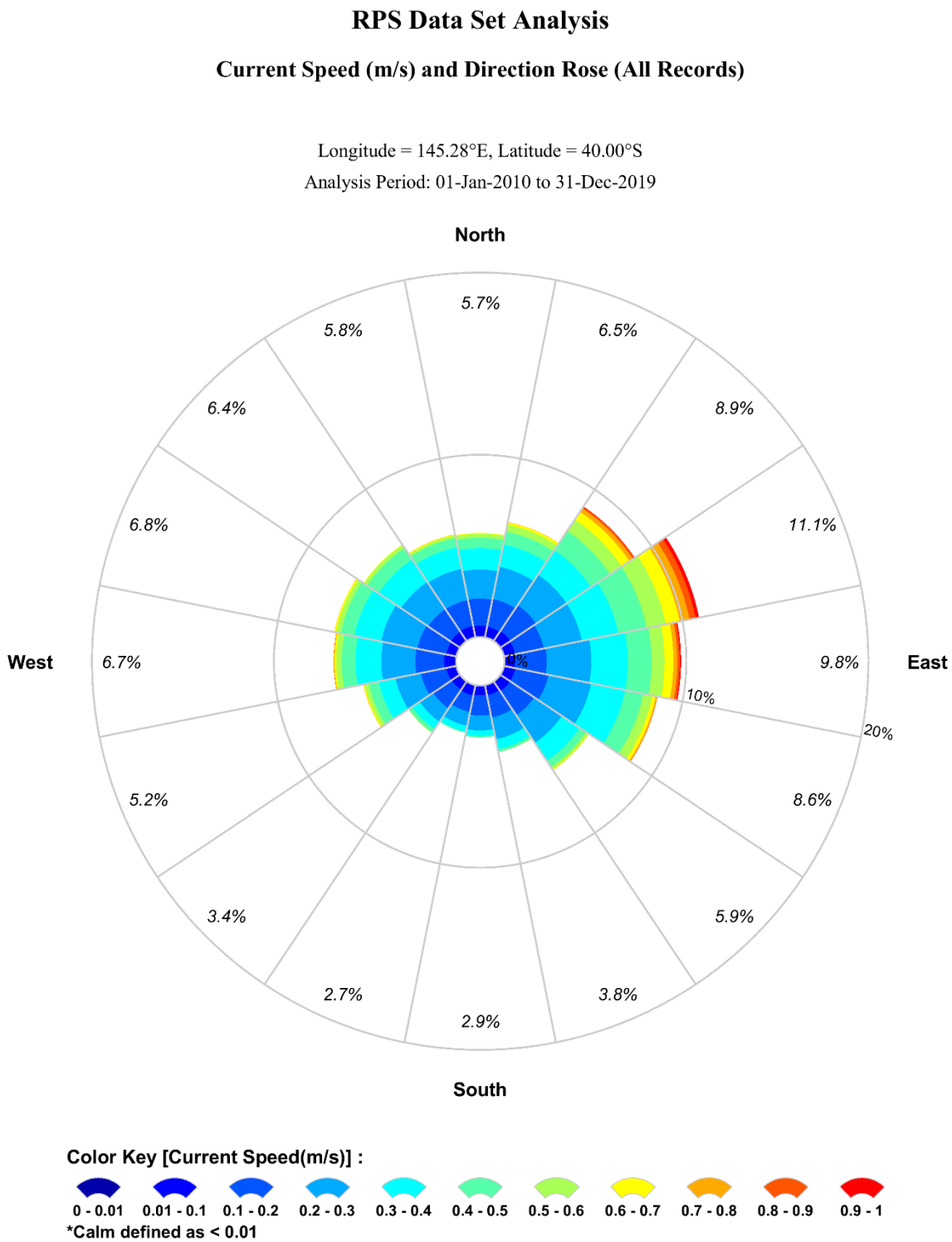

Figure 3-8 show the monthly and total surface current rose distributions nearby the release location.

Note the convention for defining current direction is the direction the current flows towards, which is used to reference current direction throughout this report. Each branch of the rose represents the currents flowing to that direction, with north to the top of the diagram. Sixteen directions are used. The branches are divided into

segments of different colour, which represent the current speed ranges for each direction. Speed intervals of 0.1 m/s are predominantly used in these current roses. The length of each coloured segment is relative to the proportion of currents flowing within the corresponding speed and direction.

Table 3-2 Predicted monthly average and maximum surface current speeds nearby the Bellerive release location. The data was derived by combining the HYCOM ocean data and HYDROMAP tidal data from 2010–2019 (inclusive).

Month	Average current speed (m/s)	Maximum current speed (m/s)	General direction(s) (towards)
January	0.27	0.95	ENE
February	0.27	0.89	ENE
March	0.27	1.21	NE
April	0.27	1.01	E
May	0.30	1.36	NE
June	0.28	1.08	E
July	0.32	1.38	E
August	0.32	1.31	ENE
September	0.30	1.11	NE
October	0.29	1.05	NE
November	0.28	1.03	NE
December	0.28	0.94	NE
Minimum	**0.27**	**0.89**	**-**
Maximum	**0.32**	**1.38**	**-**

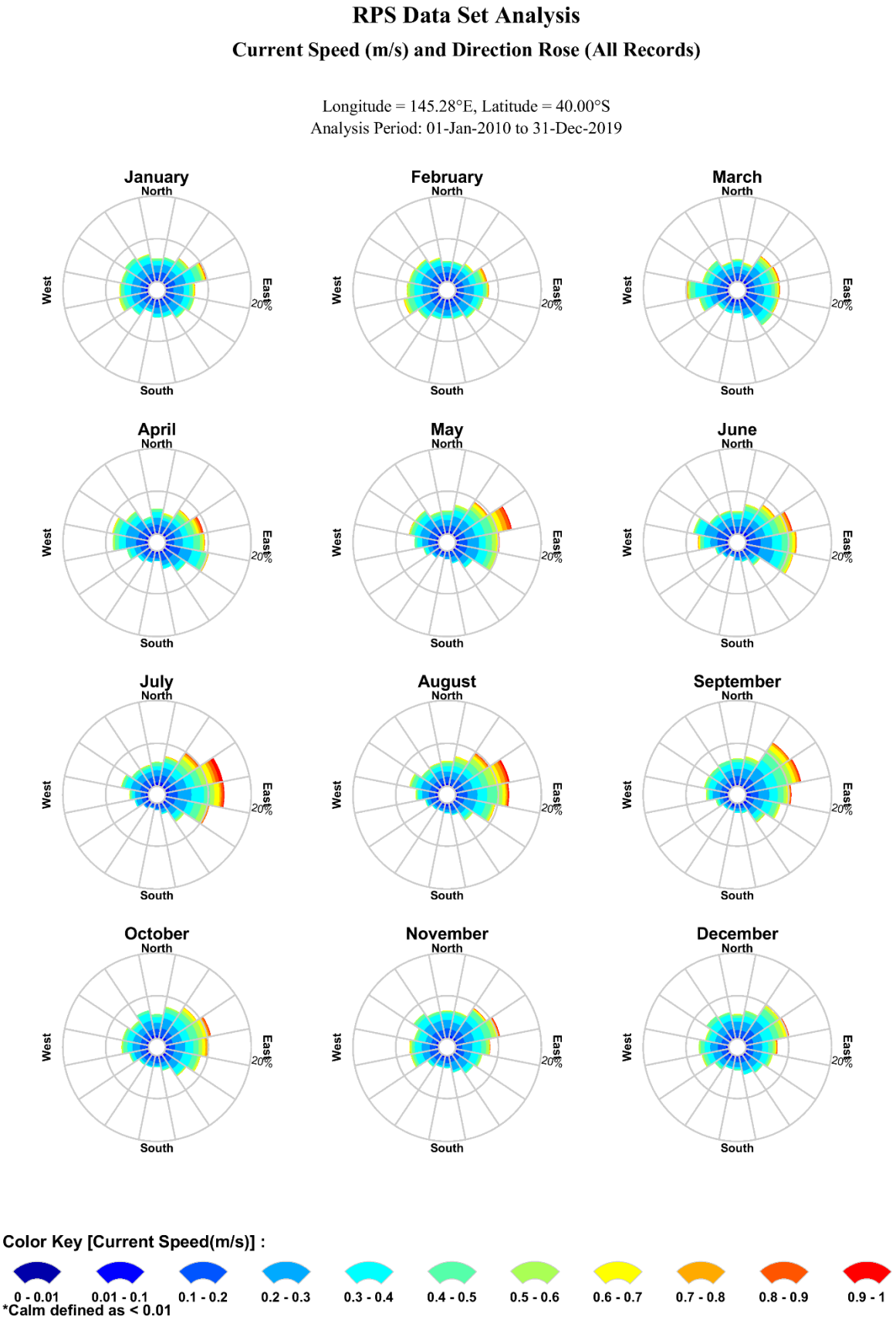

Figure 3-7 **Monthly surface current rose plots nearby the Bass 4 release location (derived by combining the HYDROMAP tidal currents and HYCOM ocean currents for 2010–2019 (inclusive).**

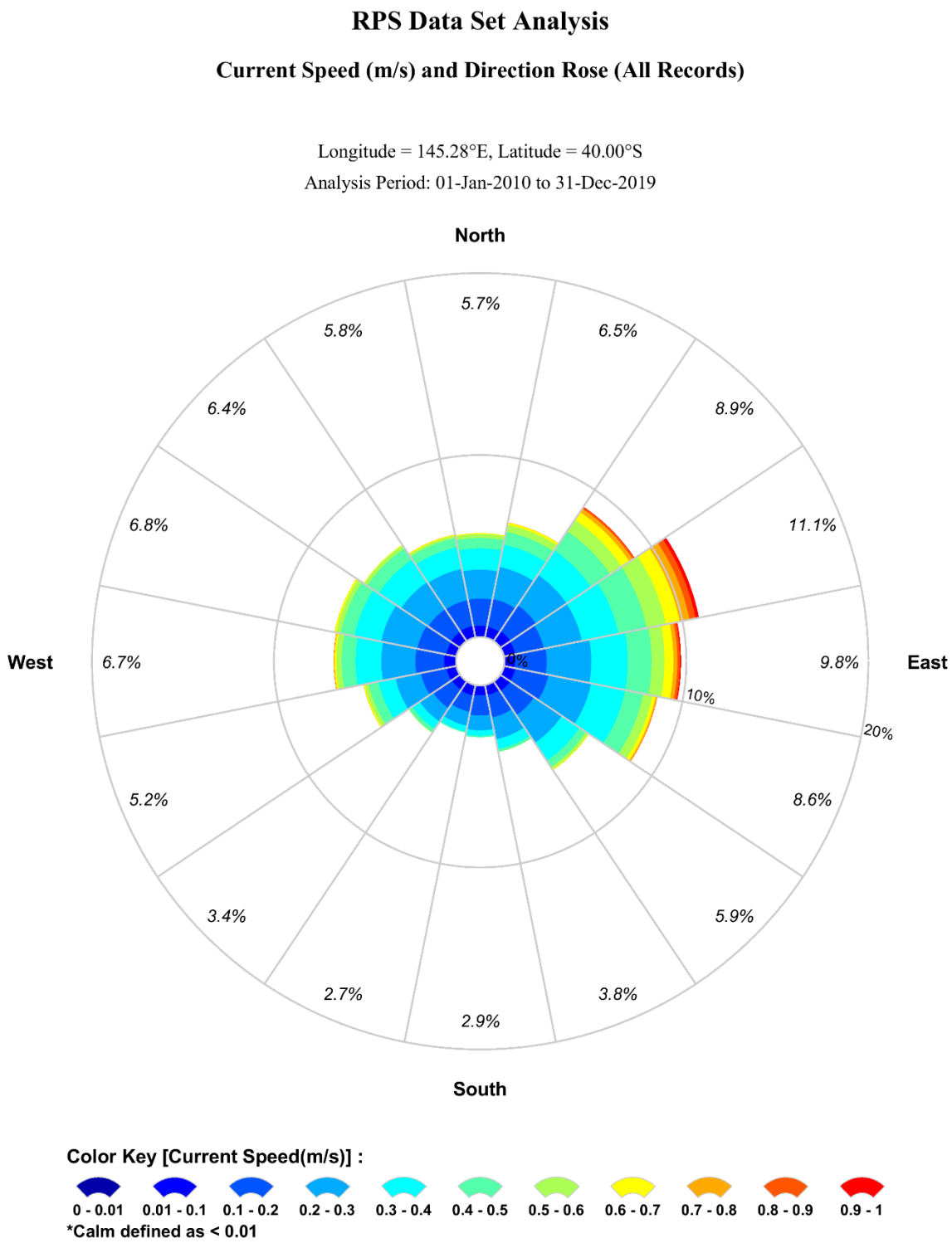

Figure 3-8 **Total surface current rose plot nearby the Bass 4 release location (derived by combining the HYDROMAP tidal currents and HYCOM ocean currents for 2010–2019 (inclusive).**

4 WIND DATA

High resolution wind data for the years 2010 to 2019 (inclusive) was sourced from the National Centre for Environmental Prediction (NCEP) Climate Forecast System Reanalysis dataset (CFSR; see Saha et al., 2010). The CFSR wind model is a fully coupled, data-assimilative hindcast model representing the interaction between the earth's oceans, land and atmosphere. The gridded wind data output is available at ¼ of a degree resolution (~33 km) and 1-hourly time intervals. Figure 4-1 shows the spatial resolution of the wind field used as input into the oil spill model.

Table 4-1 presents the monthly average and maximum winds derived from a CFSR wind node nearby the Bass 4 release location. The wind data demonstrated average monthly wind speeds ranging from 15.91 knots (April) to 19.61 knots (July) with maximums ranging between 38.35 knots (January) and 51.67 knots (May).

Near the Bass 4 release location, the dominant wind direction was predominantly south-westerly.

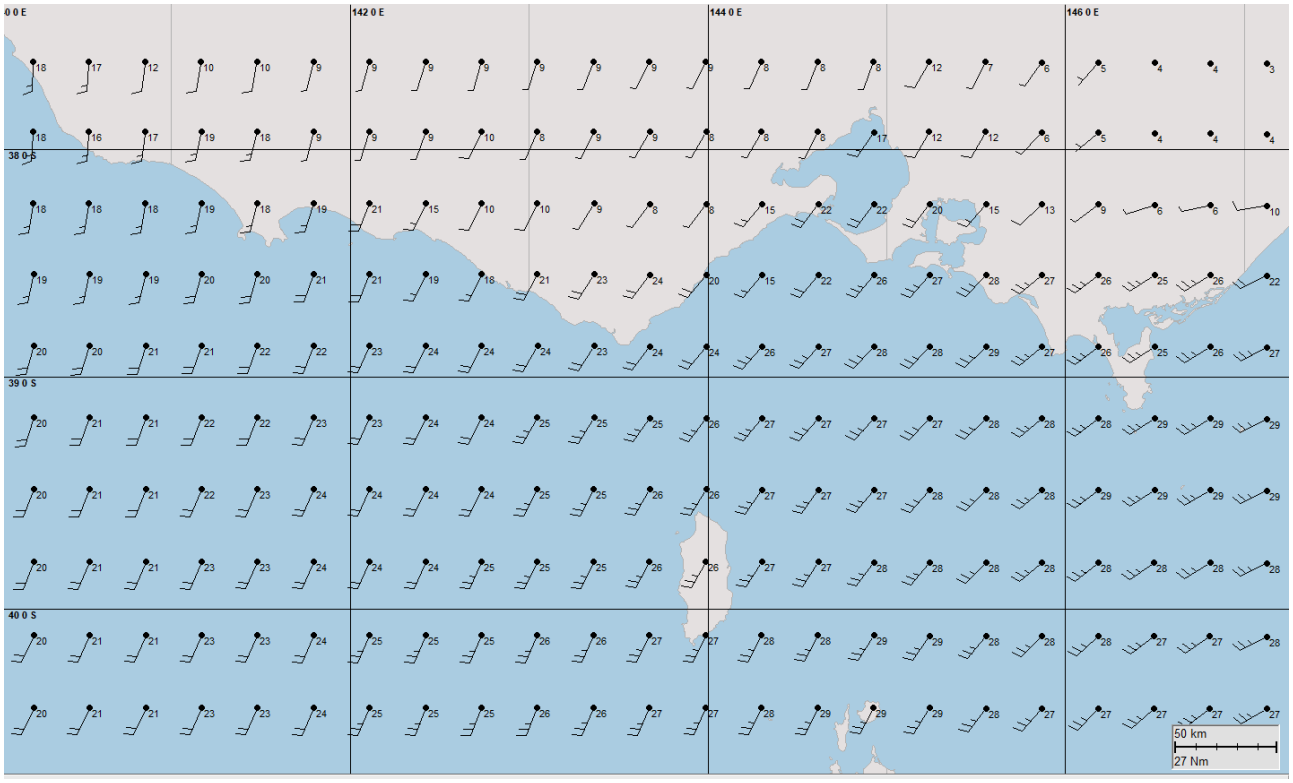

Figure 4-1 Spatial resolution of the CFSR modelled wind data used as input into the oil spill model.

Figure 4-2 and Figure 4-3 show the monthly and total wind rose distributions derived from the CFSR data for the selected node nearby the Bass 4 release location.

Note that the atmospheric convention for defining wind direction, that is, the direction the wind blows from, is used to reference wind direction throughout this report. Each branch of the rose represents wind coming from that direction, with north to the top of the diagram. Sixteen directions are used. The branches are divided into segments of different colour, which represent wind speed ranges from that direction. Speed ranges of 5 knots are predominantly used in these wind roses. The length of each segment within a branch is proportional to the frequency of winds blowing within the corresponding range of speeds from that direction.

Table 4-1 Predicted average and maximum winds representative for the selected node nearby the Bellerive release location. Data derived from CFSR hindcast model from 2010–2019 (inclusive).

Month	Average wind speed (knots)	Maximum wind speed (knots)	General direction(s) (from)
January	15.94	38.35	SW
February	16.47	42.93	SSW
March	16.19	42.86	SW
April	15.91	44.14	WSW
May	18.00	51.67	W
June	17.45	45.14	W
July	19.61	48.89	WNW
August	19.11	47.21	W
September	18.18	46.06	WSW
October	16.99	42.86	WSW
November	16.66	42.26	SW
December	16.32	39.81	SW
Minimum	**15.91**	**38.35**	-
Maximum	**19.61**	**51.67**	-

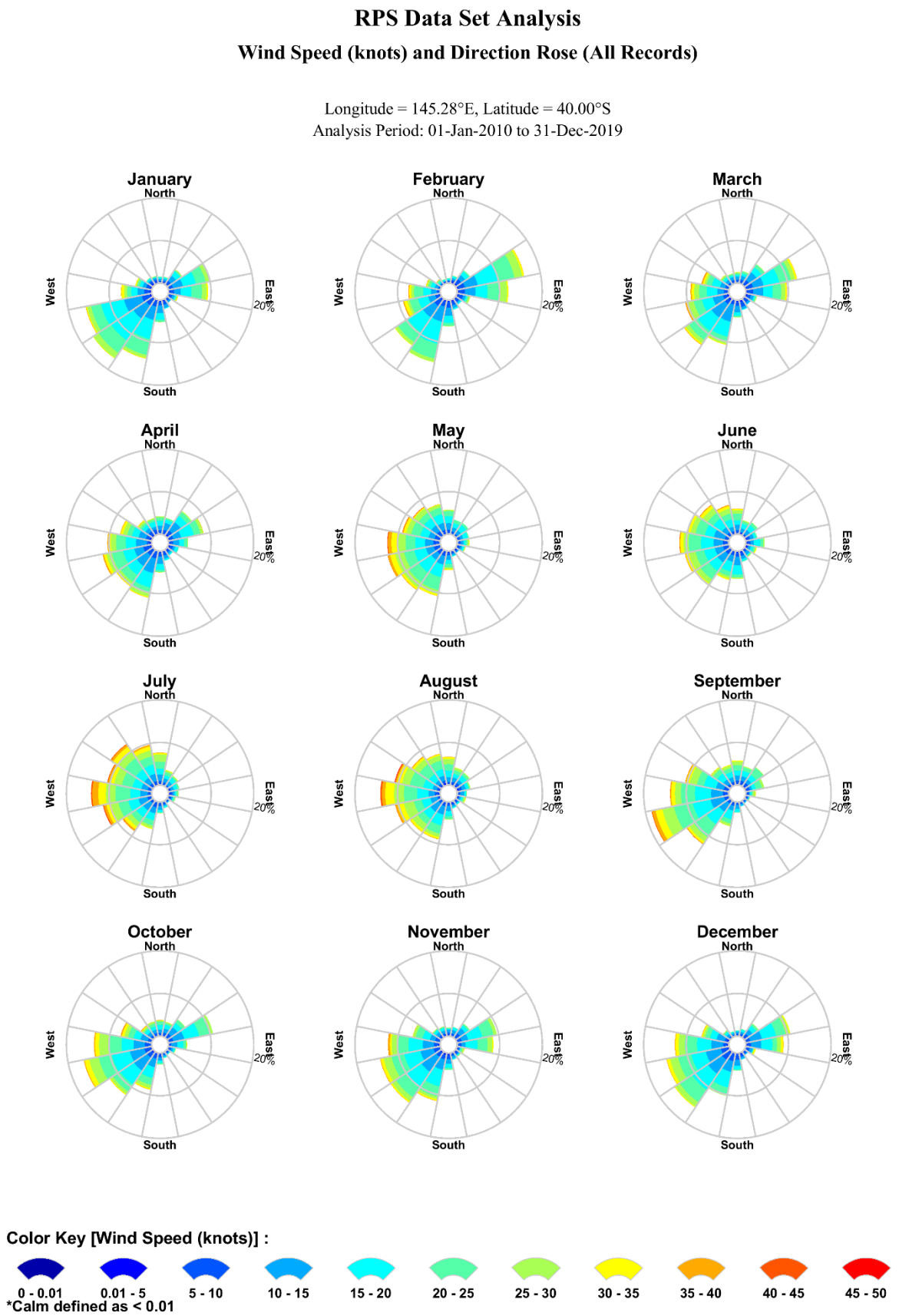

Figure 4-2 **Modelled monthly wind rose distributions from 2010–2019 (inclusive) for the node nearby the Bass 4 release location.**

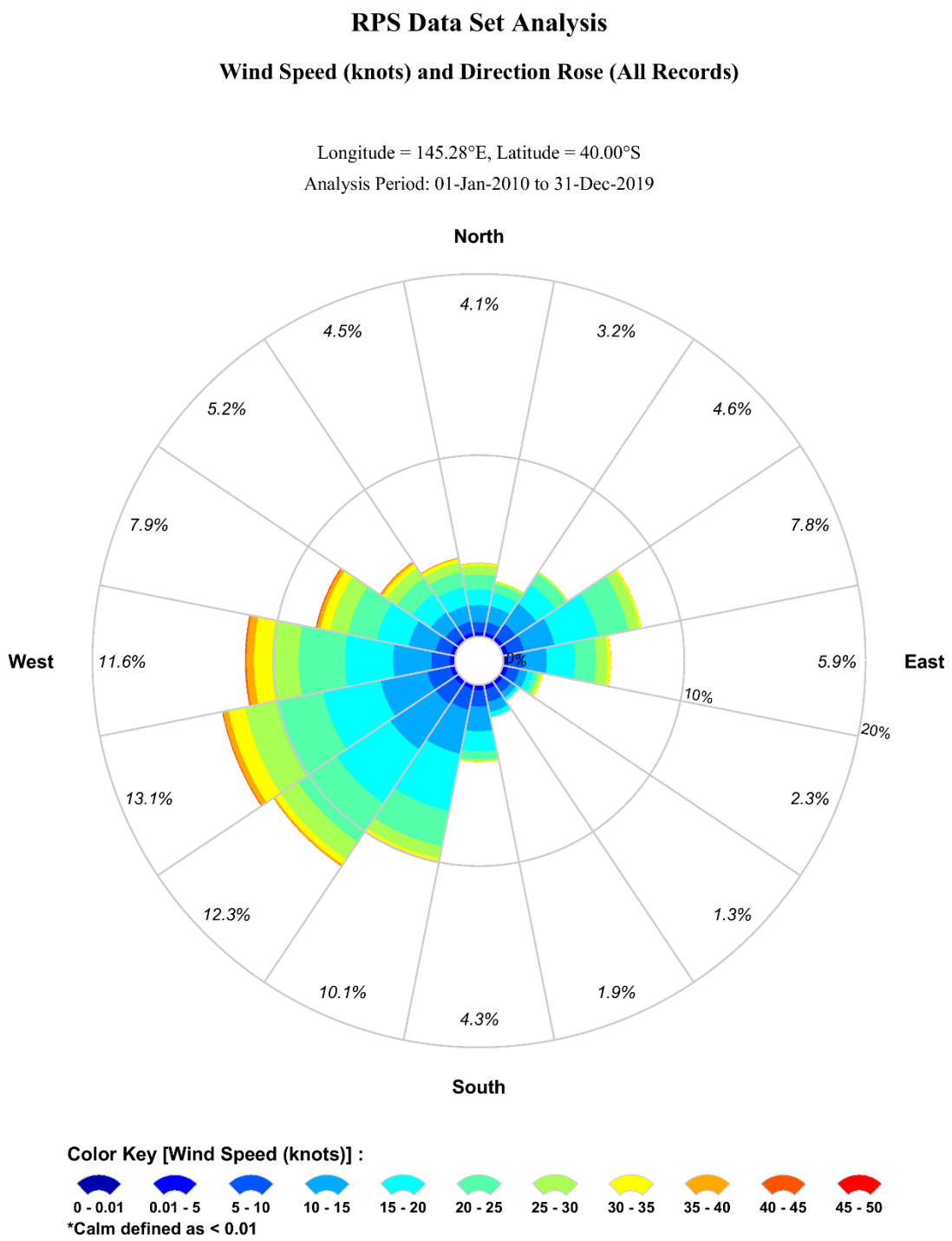

Figure 4-3 **Modelled total wind rose distributions from 2010–2019 (inclusive) for the node nearby the Bass 4 release location.**

5 WATER TEMPERATURE AND SALINITY

The monthly spatially varying water temperature and salinity profiles across the model domain were obtained from the HYCOM model (Section 3.2).

Figure 5-1 illustrates the vertical profile of sea temperature and salinity nearby the Bass 4 release locations.

Table 5-1 presents the sea temperature and salinity of the surface layer nearby the release location. The monthly average sea surface temperatures ranged between 12.4°C (September) and 19.4°C (March). The monthly average salinity values remain relatively consistent ranging between 35.2 psu and 35.4 psu.

Table 5-1 Monthly average sea surface temperature and salinity nearby the Bass 4 release location.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperature (ºC)	17.4	18.7	19.4	18.1	15.7	14.4	13.6	12.9	12.4	12.9	14.2	15.4
Salinity (psu)	35.3	35.4	35.4	35.5	35.3	35.3	35.3	35.3	35.2	35.2	35.2	35.2

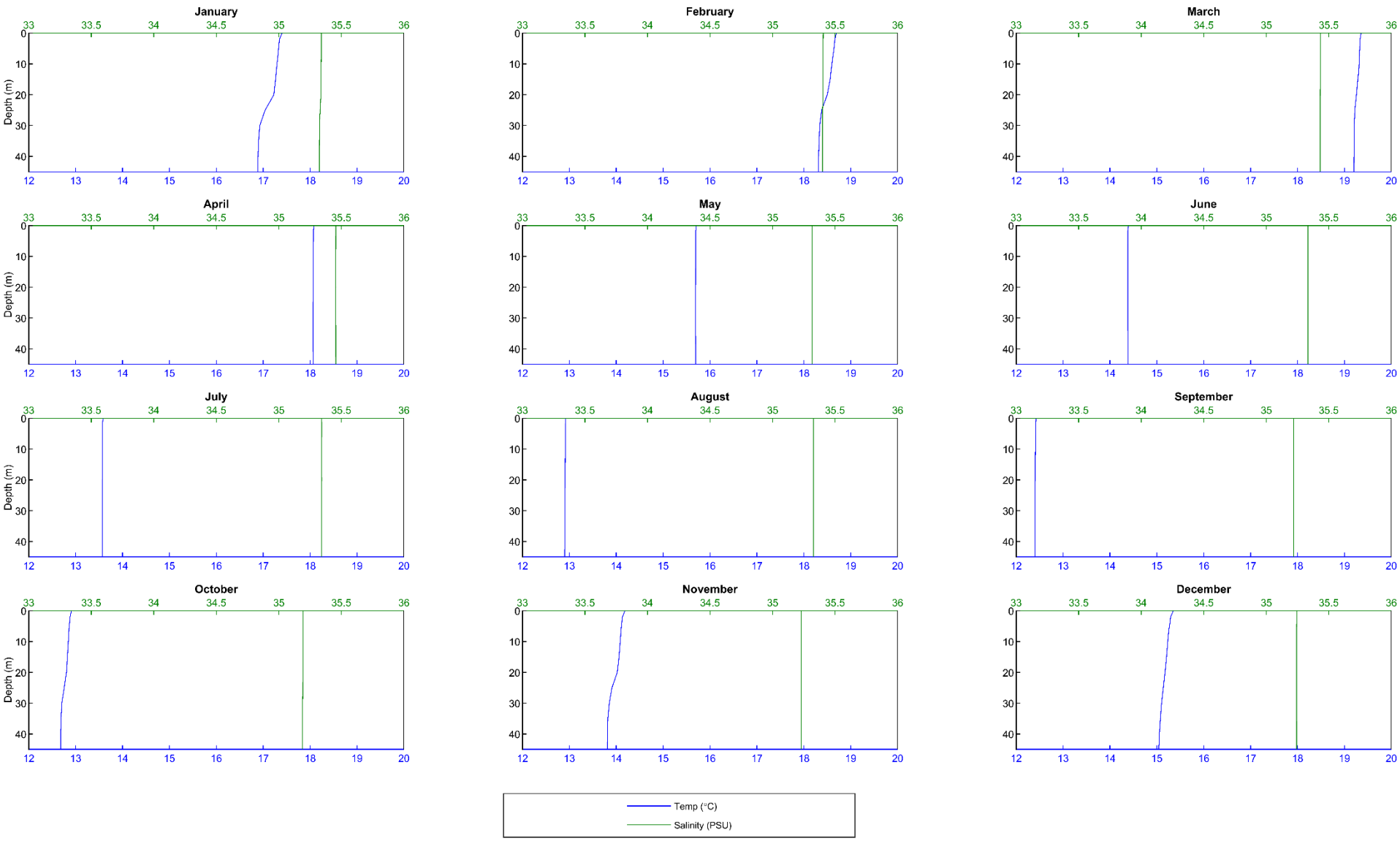

Figure 5-1 Temperature and salinity profiles nearby the Bass 4 release location.

6 SUBSEA PLUME MODEL – OILMAP DEEP

In the event of a subsea release, the gas and condensate will initially behave like a jet, which dissipates in the water column over a short distance (<10 m). The escaping condensate shear into small droplets due to turbulence generated by passing through the exit hole and subsequent turbulence generated in the plume jet. The size-distribution of the droplets will vary with the exit velocity and viscosity of the condensate. Following this phase, the density and buoyancy difference of the gas and condensate mixture relative to the surrounding waters, forces the plume upward. As the plume rises, the volume of gas will increase due to reduction of water pressure, with gas bubbles dividing into an increasing number of bubbles due to the shearing effect exerted by the water column.

In shallow water (<200 m) the rising plume will tend to reach the sea surface before deflecting away from the centre of the plume (Spaulding et al., 2000). Figure 6-1 conceptually illustrates the various stages of a subsea release of oil and gas.

The OILMAP Deep model (Spaulding et al. 2015) was used to simulate the near-field behaviour of the gas-condensate subsea release in two phases – the initial jet phase and the buoyant plume phase. The initial jet phase is predominately driven by the exit velocity. During this phase, the condensate droplet-size-distributions are calculated for a range of classes or bins. Next, the plume model predicts the rise dynamics of the condensate and gas plume to calculate at which point gas lift will be lost (i.e., the trapping height).

Outputs which include the plume trapping height, plume diameter and droplet size distribution are used as input to the SIMAP model to simulate the rise and dispersion of the condensate droplets from this point onwards.

More details on the OILMAP-DEEP model, can be found in Spaulding et al. (2015). The model has been validated against observations from Deepwater Horizon as well as small and large-scale laboratory studies on subsurface oil releases (Brandvik et al 2013, 2014; Belore 2014; Spaulding et al. 2015; Li et al. 2017).

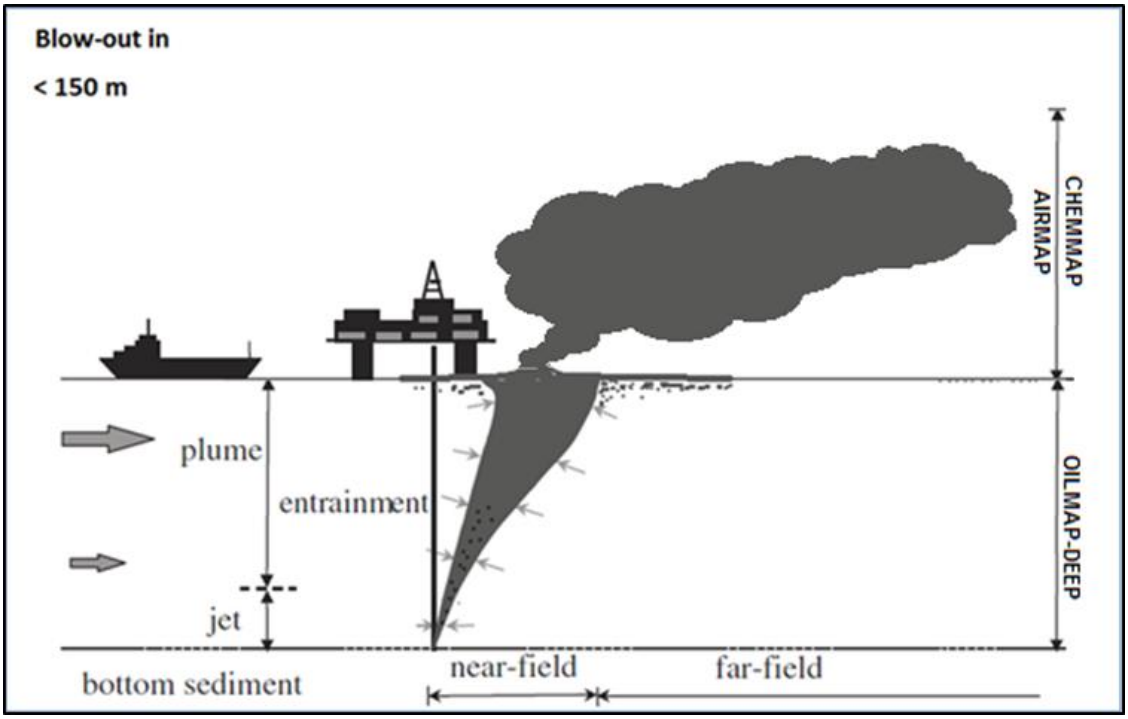

Figure 6-1 Schematic of the various stages of the plume in the water column (Source: ASA, 2011).

Table 6-1 presents the input parameters and key results for the subsea plume modelling.

The subsea modelling showed that in the event of a loss of well control at Bass 4, the amalgamated gas and condensate would propel rapidly upward from the seabed and breach the sea surface. Droplet sizes would initially range from 50 µm to 216 µm on day-1 and increase in size to 89 µm to 425 µm by day-86.

Table 6-1 Input data and key results for the subsea plume modelling.

Input Variable	Bass 4
Scenario	Loss of well control
Water depth	60 m
Tubing diameter	8.5”
Condensate discharge rate	Day-1: 21,017 STB/day Day-86: 11,152 STB/day
Gas discharge rate	Day-1: 451 MMscf/day Day-86: 239 MMscf/day
Formation water discharge rate	Day-1: 812 STB/day Day-86: 1,048 STB/day
Key Results	
Plume execution depth (m BMSL)	0 (Breach the sea surface)
Droplet sizes (µm)	Day-1: 50 to 216 Day-86: 89 to 425

7 OIL SPILL MODEL – SIMAP

Modelling of the fate of oil was performed using the Spill Impact Model Application Program (SIMAP). SIMAP is designed to simulate the fate and effects of spilled hydrocarbons for both the surface and subsurface releases (Spaulding et al., 1994; French et al., 1999; French-McCay, 2003, 2004; French-McCay et al., 2004).

SIMAP has been used to predict the weathering and fate of oil spills during and after major incidents including: Montara (Australia) well blowout August 2009 in the Timor Sea (Asia-Pacific ASA, 2010); Macondo (USA) well blowout April 2010 in the Gulf of Mexico; Bohai Bay (China) oil spill August 2011; and the pipeline oil spill July 2013 in the Gulf of Thailand.

The SIMAP model calculates the transport, spreading, entrainment, evaporation and decay of surface hydrocarbon slicks as well as the entrained and dissolved oil components in the water column, either from surface slicks or from oil discharged subsea. The movement and weathering of the spilled oil is calculated for specific oil types. Input specifications for oil mixtures include the density, viscosity, pour point, distillation curve (volume lost versus temperature) and the aromatic/aliphatic component ratios within given boiling point (BP) ranges.

SIMAP is a three-dimensional model that allows for various response actions to be modelled including oil removal from skimming, burning, or collection booms, and surface and subsurface dispersant application.

The SIMAP oil spill model includes advanced weathering algorithms, specifically focussed on unique oils that tend to form emulsions and/or tar balls. The weathering algorithms are based on 5 years of extensive research conducted in response to the Deepwater Horizon oil spill in the Gulf of Mexico (French-McCay et al., 2015).

Biodegradation is included in the oil spill model. In the model, SIMAP, degradation is calculated for the surface slick, deposited oil on the shore, the entrained oil and dissolved constituents in the water column, and oil in the sediments. For surface oil, water column oil and sedimented oil a first order degradation rate is specified. Biodegradation rates are relatively high for hydrocarbons in dissolved state or in dispersed small droplets.

7.1 Stochastic Modelling

For the stochastic modelling presented herein, **200 oil spills** (100 per season) were modelled for each of the 4 scenarios using the same spill information (release location, spill volume, duration and oil type) but with varied start dates per scenario. During each simulation, the model records whether any grid cells are exposed to any oil concentrations, the concentrations involved and the elapsed time before exposure. The results of all 100 oil spill simulations per season (per scenario) were analysed to determine the following statistics for every grid cell:

- Exposure load (concentrations).
- Minimum time before exposure.
- Maximum duration of exposure.
- Probability of contact above defined concentrations.
- Volume of oil that may accumulate on shorelines from any single simulation.
- Concentration that might occur on sections of individual shorelines.
- Exposure (instantaneous) to dissolved hydrocarbons in the water column.
- Exposure (instantaneous) to entrained hydrocarbons in the water column; and
- Residence time, or the longest continuous period floating oil, and dissolved and entrained hydrocarbons persisted at a point above a threshold.

7.2 Floating, Shoreline and In-Water Thresholds

The thresholds and their relationship to exposure for the sea surface, shoreline and water column (entrained and dissolved hydrocarbons) are presented in Sections 7.2.1 to 7.2.3. Supporting justifications of the adopted thresholds applied during the study and additional context relating to the area of influence are also provided. It is important to note that the thresholds herein are based on NOPSEMA (2019).

7.2.1 Floating Oil Exposure Thresholds

The modelling results can be presented to any levels; therefore, thresholds have been specified (based on scientific literature) to record floating oil exposure to the sea-surface at meaningful levels only, described in the following paragraphs.

The low threshold to assess the potential for floating oil exposure, was 1 g/m^2, which equates approximately to an average thickness of 1 µm, referred to as visible oil. Oil of this thickness is described as rainbow sheen in appearance, according to the Bonn Agreement Oil Appearance Code (Bonn Agreement, 2009; AMSA, 2014) (see Table 7-1). Figure 7-1 shows photographs highlighting the difference in appearance between a silvery sheen, rainbow sheen and metallic sheen. This threshold is considered below levels which would cause environmental harm and it is more indicative of the areas perceived to be affected due to its visibility on the sea surface and potential to trigger temporary closures of areas (i.e. fishing grounds) as a precautionary measure. Table 7-1 provides a description of the appearance in relation to exposure zone thresholds used to classify the zones of floating oil exposure.

Ecological impact has been estimated to occur at 10 g/m^2 (a film thickness of approximately 10 µm or 0.01 mm) according to French et al. (1996) and French-McCay (2009) as this level of fresh oiling has been observed to mortally impact some birds through adhesion of oil to their feathers, exposing them to secondary effects such as hypothermia. The appearance of oil at this average thickness has been described as a metallic sheen (Bonn Agreement, 2009).

Scholten et al. (1996) and Koops et al. (2004) indicated that at oil concentrations on the sea surface of 25 g/m^2 (or greater), would be harmful for all birds that have landed in an oil film due to potential contamination of their feathers, with secondary effects such as loss of temperature regulation and ingestion of oil through preening. The appearance of oil at this thickness is also described as metallic sheen (Bonn Agreement, 2009). For this study the high exposure threshold was set to 50 g/m^2 and above based on NOPSEMA (2019). This threshold can also be used to inform response planning.

Table 7-2 defines the thresholds used to classify the zones of floating oil exposure reported herein.

Table 7-1 The Bonn Agreement Oil Appearance Code.

Code	Description Appearance	Layer Thickness Interval (g/m^2 or µm)	Litres per km^2
1	Sheen (silvery/grey)	0.04 – 0.30	40 – 300
2	Rainbow	0.30 – 5.0	300 – 5,000
3	Metallic	5.0 – 50	5,000 – 50,000
4	Discontinuous True Oil Colour	50 – 200	50,000 – 200,000
5	Continuous True Oil Colour	≥ 200	≥ 200,000

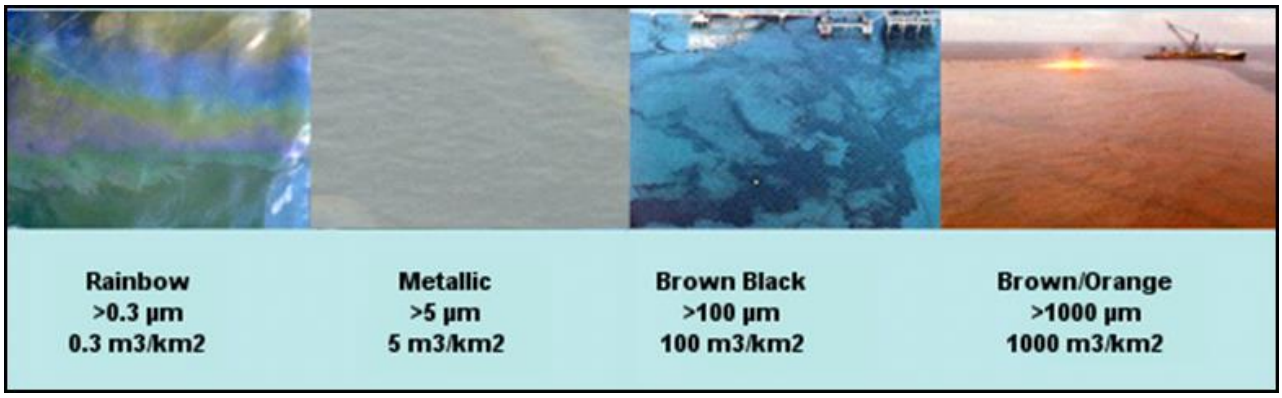

Figure 7-1 Photographs showing the difference between oil colour and thickness on the sea surface (source: adapted from Oil Spill Solutions, 2015).

Table 7-2 Floating oil exposure thresholds used in this report (in alignment with NOPSEMA, 2019).

Threshold level	Floating oil (g/m^2)	Description
Low	1	Approximates range of socioeconomic effects and establishes planning area for scientific monitoring
Moderate	10	Approximates lower limit for harmful exposures to birds and marine mammals
High	50	Approximates surface oil slick and informs response planning

7.2.2 Shoreline Accumulation Thresholds

There are many different types of shorelines, ranging from cliffs, rocky beaches, sandy beaches, mud flats and mangroves, and each of these influences the volume of oil that can remain stranded ashore and its thickness before the shoreline saturation point occurs. For instance, a sandy beach may allow oil to percolate through the sand, thus increasing its ability to hold more oil ashore over tidal cycles and various wave actions than an equivalent area of water; hence oil can increase in thickness onshore over time. A sandy beach shoreline was assumed as the default shoreline type for the modelling herein, as it allows for the highest carrying capacity of oil (of the available open/exposed shoreline types). Hence the results contained herein would be indicative of a worst-case scenario, where the highest volume of oil may be stranded on the shoreline (when compared to other shoreline types, such as exposed rocky shores).

In previous risk assessment studies, French-McCay et al. (2005a; 2005b) used a threshold of 10 g/m^2 to assess the potential for shoreline accumulation. This is a conservative threshold used to define regions of socio-economic impact, such as triggering temporary closures of adjoining fisheries or the need for shore clean-up on beaches or man-made features/amenities (breakwaters, jetties, marinas, etc.). It would equate to approximately 2 teaspoons of hydrocarbon per square meter of shoreline accumulation. The appearance is described as a stain/film. On that basis, the 10 g/m^2 shoreline accumulation threshold has been selected to define the zone of potential “low shoreline accumulation”.

French et al. (1996) and French-McCay (2009) define a shoreline oil accumulation threshold of 100 g/m^2, or above, would potentially harm shorebirds and wildlife (furbearing aquatic mammals and marine reptiles on or along the shore) based on studies for sub-lethal and lethal impacts. This threshold has been used in previous environmental risk assessment studies (see French-McCay, 2003; French-McCay et al., 2004, French-McCay et al., 2011; 2012; NOAA, 2013). Additionally, a shoreline concentration of 100 g/m^2, or above, is the minimum limit that the oil can be effectively cleaned according to the AMSA (2015) guideline. This threshold equates to approximately ½ a cup of oil per square meter of shoreline accumulation. The appearance is described as a thin oil coat. Therefore, 100 g/m^2 has been selected to define the zone of potential “moderate shoreline accumulation”.

Observations by Lin & Mendelssohn (1996) demonstrated that loadings of more than 1,000 g/m^2 of hydrocarbon during the growing season would be required to impact marsh plants significantly. Similar thresholds have been found in studies assessing hydrocarbon impacts on mangroves (Grant et al., 1993; Suprayogi & Murray, 1999). Hence, 1,000 g/m^2 has been selected to define the zone of potential “high

shoreline accumulation". It equates to approximately 1 litre of hydrocarbon per square meter of shoreline accumulation. The appearance is described as a hydrocarbon cover.

It is worth noting that the shoreline accumulation thresholds derived from extensive literature review (outlined in Table 7-3) agree with the commonly used threshold values for oil spill modelling specified in NOPSEMA (2019).

Table 7-3 Thresholds used to assess shoreline accumulation.

Threshold level	Shoreline loading (g/m^2)	Description
Low (socioeconomic/sublethal)	10	Predicts potential for some socio-economic impact
Moderate	100	Loading predicts area likely to require clean-up effort
High	> 1,000	Loading predicts area likely to require intensive clean-up effort

7.2.3 In-water Exposure Thresholds

Oil is a mixture of thousands of hydrocarbons of varying physical, chemical, and toxicological characteristics, and therefore, demonstrate varying fates and impacts on organisms. As such, for in-water exposure, the SIMAP model provides separate outputs for dissolved and entrained hydrocarbons from oil droplets. The consequences of exposure to dissolved and entrained components will differ because they have different modes and magnitudes of effect.

Entrained hydrocarbon concentrations were calculated based on oil droplets that are suspended in the water column, though not dissolved. The composition of this oil would vary with the state of weathering (oil age) and may contain soluble hydrocarbons when the oil is fresh. Calculations for dissolved hydrocarbons specifically calculates oil components which are dissolved in water, which are known to be the primary source of toxicity exerted by oil.

In addition to presenting the maximum instantaneous concentrations across the model domain, there are also figures presented for the residence time, which is the longest continuous period of exposure above each threshold. This helps provide context when considering exposure to sensitive receptors.

7.2.3.1 Dissolved Hydrocarbons

Laboratory studies have shown that dissolved hydrocarbons exert most of the toxic effects of oil on aquatic biota (Carls et al., 2008; Nordtug et al., 2011; Redman, 2015). The mode of action is a narcotic effect, which is positively related to the concentration of soluble hydrocarbons in the body tissues of organisms (French-McCay, 2002). Dissolved hydrocarbons are taken up by organisms directly from the water column by absorption through external surfaces and gills, as well as through the digestive tract. Thus, soluble hydrocarbons are termed "bioavailable".

Hydrocarbon compounds vary in water-solubility and the toxicity exerted by individual compounds is inversely related to solubility, however bioavailability will be modified by the volatility of individual compounds (Nirmalakhandan & Speece, 1988; Blum & Speece, 1990; McCarty, 1986; McCarty et al., 1992a, 1992b; Mackay et al., 1992; McCarty & Mackay, 1993; Verhaar et al., 1992, 1999; Swartz et al., 1995; French-McCay, 2002; McGrath and Di Toro, 2009). Of the soluble compounds, the greatest contributor to toxicity for water-column and benthic organisms are the lower-molecular-weight aromatic compounds, which are both volatile and soluble in water. Although they are not the most water-soluble hydrocarbons within most oil types, the polynuclear aromatic hydrocarbons (PAHs) containing 2-3 aromatic ring structures typically exert the largest narcotic effects because they are semi-soluble and not highly volatile, so they persist in the environment long enough for significant accumulation to occur (Anderson et al., 1974, 1987; Neff & Anderson, 1981; Malins & Hodgins, 1981; McAuliffe, 1987; NRC, 2003). The monoaromatic hydrocarbons (MAHs), including the BTEX compounds (benzene, toluene, ethylbenzene, and xylenes), and the soluble alkanes (straight chain hydrocarbons) also contribute to toxicity, but these compounds are highly volatile, so that their contribution will be low when oil is exposed to evaporation and higher when oil is discharged at depth where volatilisation does not occur (French-McCay, 2002).

French-McCay (2002) reviewed available toxicity data, where marine biota was exposed to dissolved hydrocarbons prepared from oil mixtures, finding that 95% of species and life stages exhibited 50% population mortality (LC_{50}) between 6 and 400 ppb total PAH concentration after 96 hrs exposure, with an average of 50 ppb. Hence, concentrations lower than 6 ppb total PAH value should be protective of 97.5% of species and life stages even with exposure periods of days (at least 96 hours). Early life-history stages of fish appear to be more sensitive than older fish stages and invertebrates.

Exceedances of 10, 50 or 400 ppb over a 1-hour timestep (see Table 7-4) was applied to indicate increasing potential for sub-lethal to lethal toxic effects (or low to high), based on NOPSEMA (2019).

7.2.3.2 Entrained Hydrocarbons

Entrained hydrocarbons consist of oil droplets that are suspended in the water column and insoluble. As such, insoluble compounds in oil cannot be absorbed from the water column by aquatic organisms, hence are not bioavailable through absorption of compounds from the water. Exposure to these compounds would require routes of uptake other than absorption of soluble compounds. The route of exposure of organisms to whole oil alone include direct contact with tissues of organisms and uptake of oil by direct consumption, with potential for biomagnification through the food chain (NRC, 2005).

The 10 ppb threshold represents the very lowest concentration and corresponds generally with the lowest trigger levels for chronic exposure for entrained hydrocarbons in the ANZECC & ARMCANZ (2000) water quality guidelines. Due to the requirement for relatively long exposure times (> 24 hours) for these concentrations to be significant, they are likely to be more meaningful for juvenile fish, larvae and planktonic organisms that might be entrained (or otherwise moving) within the entrained plumes, or when entrained hydrocarbons adhere to organisms or trapped against a shoreline for periods of several days or more.

This exposure zone is not considered to be of significant biological impact and is therefore outside the adverse exposure zone. This exposure zone represents the area contacted by the spill. This area does not define the area of influence as it is considered that the environment will not be affected by the entrained hydrocarbon at this level.

Thresholds of 10 ppb and 100 ppb were applied over a 1-hour time exposure (Table 7-4), to cover the range of thresholds outlined in ANZECC & ARMCANZ (2000) water quality guidelines, the incremental change for greater potential effect and is per NOPSEMA (2019).

A complicating factor that should be considered when assessing the consequence of dissolved and entrained oil distributions is that there will be some areas where both physically entrained oil droplets and dissolved hydrocarbons co-exist. Higher concentrations of each will tend to occur close to the source where sea conditions can force mixing of relatively unweathered oil into the water column, resulting in more rapid dissolution of soluble compounds.

Table 7-4 Dissolved and entrained hydrocarbon exposure values assessed over a 1-hour time step, as per NOPSEMA (2019).

Threshold level	Dissolved hydrocarbon concentration (ppb)	Entrained hydrocarbon concentrations (ppb)
Low	10	10
Moderate	50	-
High	400	100

8 OIL PROPERTIES

8.1 Oil Characteristics

Table 8-1 and Table 8-2 present the physical properties and boiling point ranges of Marine Diesel and Trefoil condensate, which was used as the proxy for the study.

Trefoil condensate has an API of 46.7 and a density of 794.1 kg/m^3 (at 15ºC) with a viscosity value (0.14 cP) classifying it as a Group II (light-persistent) oil according to the International Tankers Owners Pollution Federation (ITOPF, 2014) and US EPA/USCG classifications.

The condensate is a mixture of volatile and persistent hydrocarbons with high proportions of volatile and semi- to low-volatile components. In favourable evaporation conditions, about 41.93% of the hydrocarbon mass should evaporate within the first 12 hours (BP < 180°C); a further 30.15% should evaporate within the first 24 hours (180°C < BP < 160°C); and a further 16.95% should evaporate over several days (160°C < BP < 380°C). Approximately 11% of the condensate is shown to be persistent.

Marine diesel (MDO) has an API of 37.6 and a density of 829.1 kg/m^3 (at 25ºC) with a viscosity value (4.0 cP) classifying it as a Group II (light-persistent) oil according to the International Tankers Owners Pollution Federation (ITOPF, 2020) and US EPA/USCG classifications.

The MDO is a mixture of volatile and persistent hydrocarbons with high proportions of volatile and semi- to low-volatile components. In favourable evaporation conditions, about 6.0% of the oil mass should evaporate within the first 12 hours (BP < 180°C); a further 34.6% should evaporate within the first 24 hours (180°C < BP < 265°C); and a further 54.4% should evaporate over several days (265°C < BP < 380°C). Approximately 5.0% of the oil is shown to be persistent.

Table 8-1 Physical properties for Thylacine condensate.

Characteristic	Thylacine Condensate	MDO
Density (kg/m^3)	794.1 (at 15°C)	829.1 (at 25 °C)
API	46.7	37.6
Dynamic viscosity (cP)	0.14 (at 25 °C)	4.0 (at 25 °C)
Pour point (°C)	-3	-14
Hydrocarbon property category	Group II	Group II
Hydrocarbon property classification	Light – Persistent	Light – Persistent

Table 8-2 Boiling point ranges for Thylacine condensate.

Oil Type	Component	Volatile (%)	Semi-volatile (%)	Low-volatile (%)	Residual (%)
	Boiling point (°C)	<180 C_4 to C_{10}	180-265 C_{11} to C_{15}	265-380 C_{16} to C_{20}	>380 >C_{20}
Trefoil Condensate	% of total	41.93	30.15	16.95	10.97
Marine Diesel	% of total	6.0	34.6	54.4	5.0

The BP are dictated by the length of the carbon chains, with the longer and more complex compounds having a higher boiling point, and therefore lower volatility and evaporation rate.

Typical evaporation times once the hydrocarbons reach the surface and are exposed to the atmosphere are:

- Up to 12 hours for the C_4 to C_{10} compounds (or <180°C BP).
- Up to 24 hours for the C_{11} to C_{15} compounds (180–265°C BP).
- Several days for the C_{16} to C_{20} compounds (265–380°C BP).
- Not applicable for the residual compounds (BP >380°C), which will resist evaporation, persist in the marine environment for longer periods, and be subject to relatively slow degradation.

The actual fate of oil will depend greatly on the amount that reaches the surface.

8.2 Weathering Characteristics

A series of model weather tests were conducted to illustrate the potential behaviour of Trefoil condensate and marine diesel when exposed to idealised and representative environmental conditions:

- A 50 m^3 surface release over 1-hour under calm wind conditions (constant 5 knots or 2.6 m/s), assuming low seasonal water temperature (15°C) and ambient tidal and drift currents; and
- A 50 m^3 surface release over 1-hour under variable wind conditions (1-12 knots or 1.9-23 m/s, drawn from representative data files), assuming low seasonal water temperature (15°C) and ambient tidal and drift currents.

Note, a surface release is used in the weathering test to solely focus on the weathering and fates of the hydrocarbons when exposed to atmospheric conditions.

The first case is indicative conditions that would not generate entrainment, while the second case may represent conditions that could cause a minor degree of entrainment. Both scenarios provide examples of potential behaviour during a spill once the oil reaches the surface.

Trefoil Condensate Mass Balance Forecasts

The mass balance for the Trefoil condensate under the constant 5 knot (~2.5 m/s) wind case (**Error! Reference source not found.**) shows that 72.2% of the condensate is predicted to evaporate within 24 hours. Under the calm conditions, the majority of condensate remaining on the water surface will weather at a slower rate due to the longer-chain compounds with higher boiling points. Evaporation shall cease when the residual compounds remain, and they will be subject to more gradual decay through biological and photochemical processes.

Under the variable-wind case (**Error! Reference source not found.**), where the winds are of greater strength on average, therefore entrainment of Trefoil condensate into the water column is predicted to increase. Approximately 24 hours after the spill, 32.2% is forecast to have entrained and a further 66.5% is forecast to have evaporated, leaving only a small proportion floating on the water surface (<0.1%).

The increased level of entrainment for the variable-wind case results in a higher percentage decaying at an approximate rate of 0.9% per day or ~6.9% after 7 days, compared to <0.1% per day and a total of 1.2% after 7 days for the constant-wind case. Given the proportion of entrained oil and the tendency for it to remain mixed in the water column, the remaining hydrocarbons will decay over time scales of several weeks.

Marine Diesel Mass Balance Forecasts

The mass balance for the MDO under the constant 5 knot (~2.5 m/s) wind case (Figure 8-3) shows that 40.3% of the oil is predicted to evaporate within 24 hours. Under calm conditions, the majority of the remaining oil on the water surface will weather at a slower rate due to being comprised of the longer-chain compounds with higher boiling points. Evaporation shall cease when the residual compounds remain, and they will be subject to more gradual decay through biological and photochemical processes.

Under the variable-wind case (Figure 8-4), where the winds are of greater strength on average, entrainment of MDO into the water column is predicted to increase. Approximately 24 hours after the spill, 60.1% of the oil mass is forecast to have entrained and a further 38.4% is forecast to have evaporated, leaving only a small proportion of the oil floating on the water surface (<0.1%).

The increased level of entrainment in the variable-wind case result in a higher percentage decaying at an approximate rate of 1.5% per day with or ~10.5% after 7 days, compared to <0.1% per day and a total of 0.9% after 7 days for the constant-wind case. Given the proportion of entrained oil and the tendency for it to remain mixed in the water column, the remaining hydrocarbons will decay over time scales of several weeks.

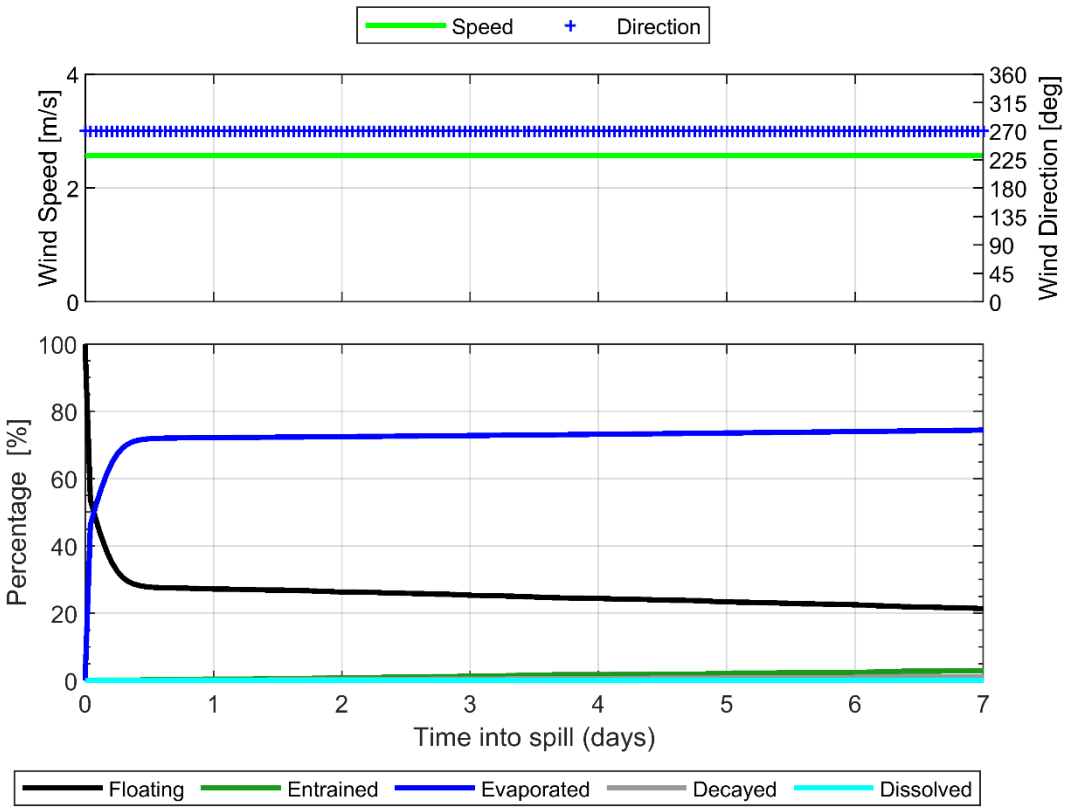

Figure 8-1 **Proportional mass balance plot representing the weathering of Trefoil condensate spilled onto the water surface over 1 hour and subject to a constant 5 knots (2.6 m/s) wind speed at 15°C water temperature.**

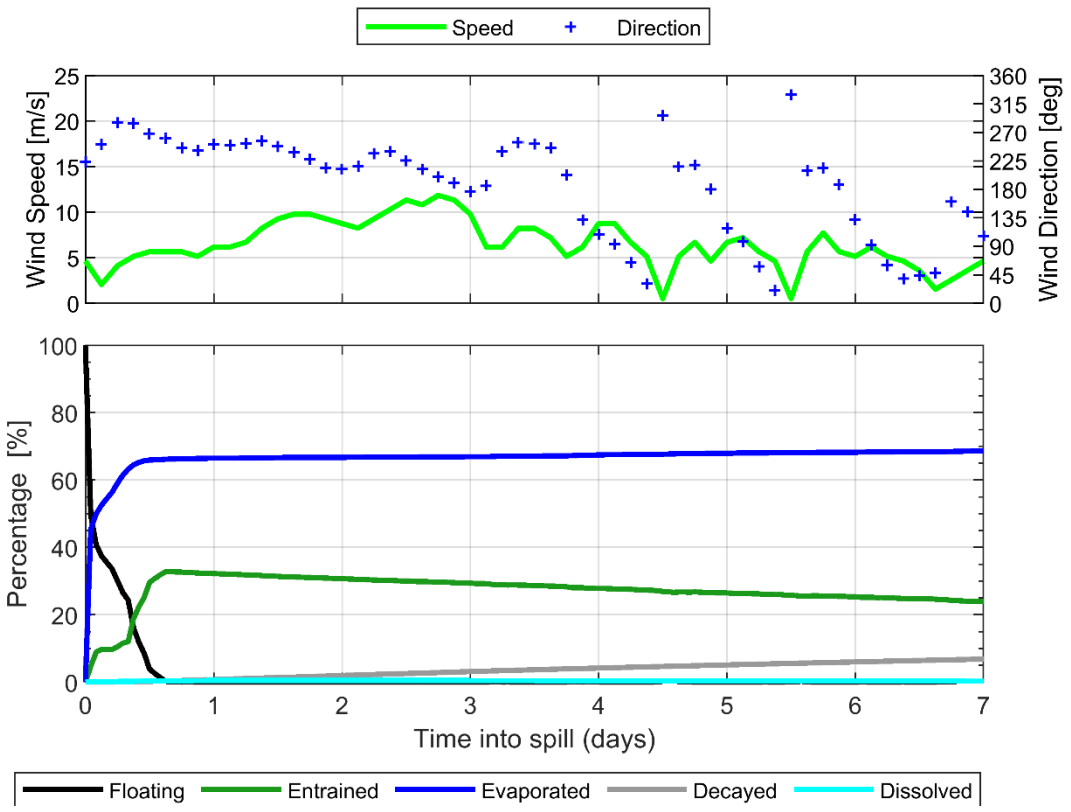

Figure 8-2 **Proportional mass balance plot representing the weathering of Trefoil condensate spilled onto the water over 1 hour and subject to variable wind speeds (1-12 knots or 1.9-23 m/s) at 15°C water temperature.**

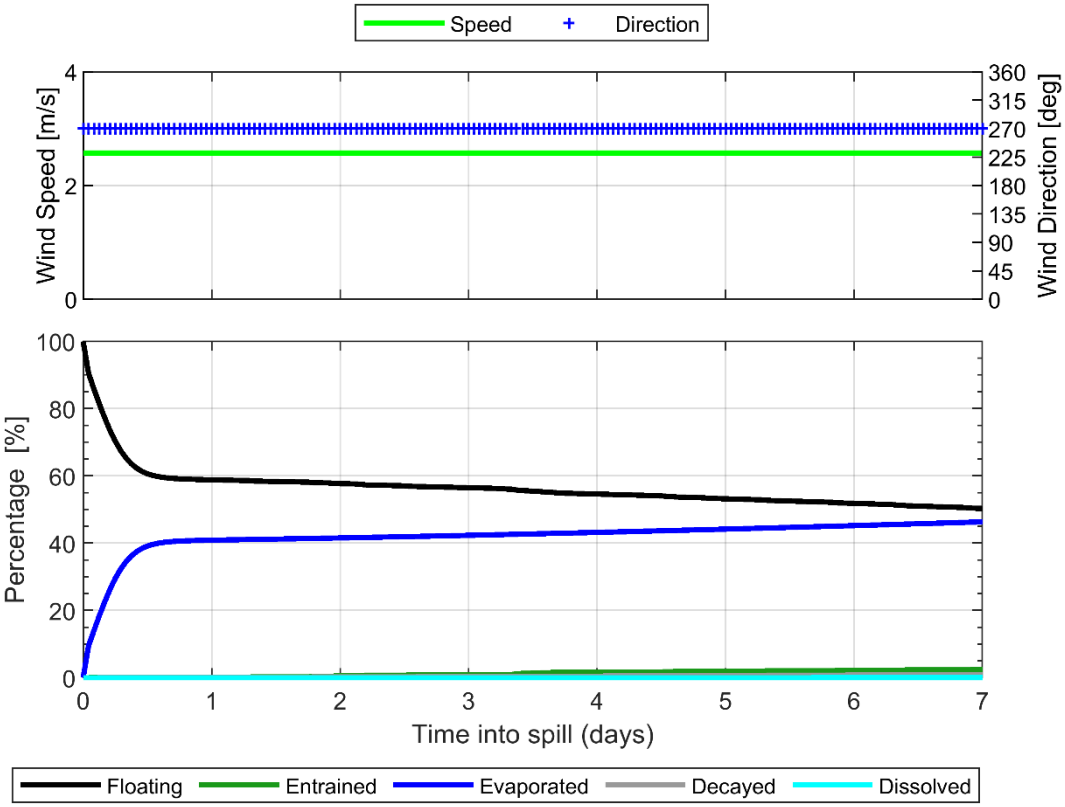

Figure 8-3 Proportional mass balance plot representing the weathering of MDO spilled onto the water surface over 1 hour and subject to a constant 5 knots (2.6 m/s) wind speed at 15°C water temperature.

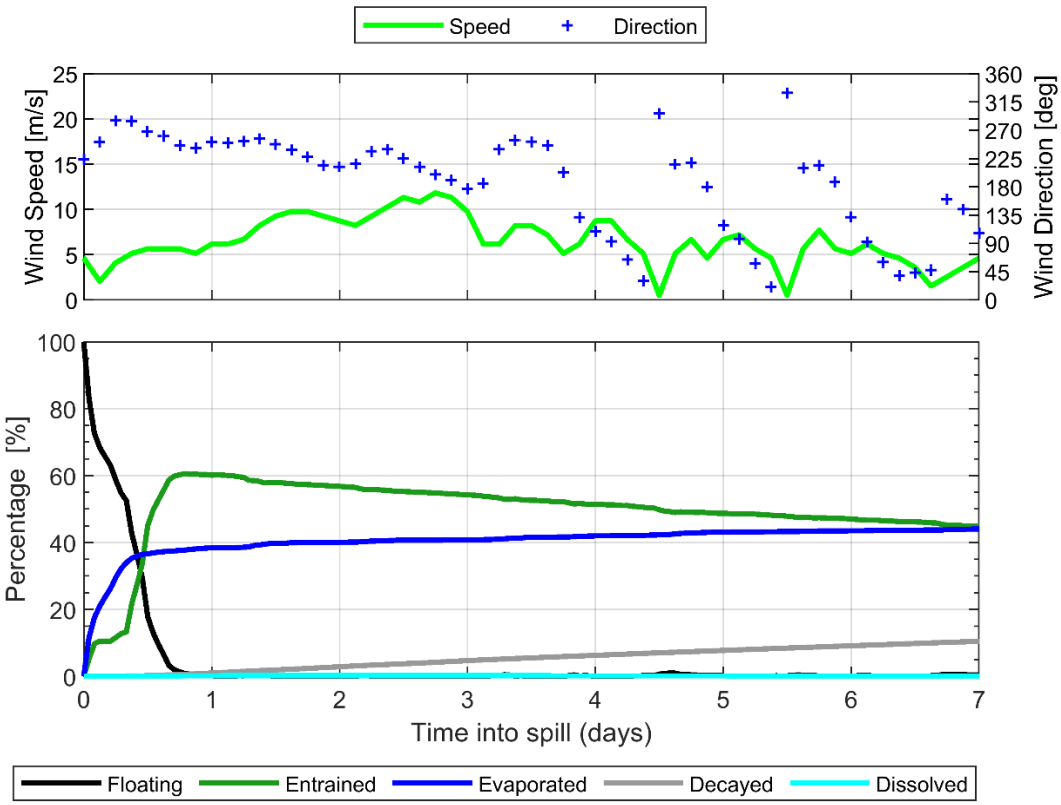

Figure 8-4 Proportional mass balance plot representing the weathering of MDO spilled onto the water over 1 hour and subject to variable wind speeds (1-12 knots) at 15°C water temperature.

9 OIL SPILL SCENARIOS

Table 9-1 provides a summary of the oil spill model settings.

Table 9-1 Summary of the oil spill model settings and thresholds used in this assessment.

Parameter	Scenario 1	Scenario 2
Description	Loss of well control	Loss of containment
Number of randomly selected spill start times	100 per season	100 per season
Model period	Summer (November through to March) and Winter (April to October)	
Oil type	Condensate	Marine Diesel
Spill volume	1,177,496.54 STB (~187,207 m^3)	603.7 m^3
Release type	Subsea (60 m)	Surface
Release duration	86 days (variable release rate)	6 hours
Simulation length	100 days	30 days
Surface oil concentration thresholds (g/m^2)^	1 (low); 10 (moderate); 50 (high)	
Shoreline oil accumulation thresholds (g/m^2)^	10 (low); 100 (moderate); 1,000 (high)	
Dissolved hydrocarbon concentrations (ppb)^	10 (low); 50 (moderate); 400 (high)	
Entrained hydrocarbon concentrations (ppb)^	10 (low); 100 (high)	

^Thresholds based on NOPSEMA (2019)

10 PRESENTATION AND INTERPRETATION OF MODEL RESULTS

The results from the modelling study are presented in a number of tables and figures, which aim to provide an understanding of the predicted sea-surface and water column (subsurface) exposure and shoreline accumulation (if predicted).

10.1 Annual Analysis

10.1.1 Statistics

The statistics are based on the following principles:

- The ***greatest distance travelled by a spill trajectory*** – is determined by a) recording the maximum and b) second greatest distance travelled (or 99th percentile) by a single trajectory, within a scenario, from the release location to the identified exposure thresholds.

- The ***probability of oil exposure to a receptor*** – is determined by recording the number of spill trajectories to reach a specified sea surface or subsea threshold within a receptor polygon, divided by the total number of spill trajectories within that scenario.

- The ***minimum time before oil exposure to a receptor*** – is determined by ranking the elapsed time before sea surface exposure, at a specified threshold, to grid cells within a receptor polygon and recording the minimum value.

- The ***maximum residence time for oil exposure within a receptor*** – is determined by recording the longest continuous length of time a grid cell is exposed to either floating, entrained or dissolved hydrocarbon above each threshold, within a receptor.

- The ***probability of oil accumulation at a receptor*** – is determined by recording the number of spill trajectories to reach a specified shoreline accumulation threshold within a receptor polygon, divided by the total number of spill trajectories within that scenario.

- The ***maximum potential oil loading within a receptor*** – is determined by identifying the maximum loading to any grid cell within a receptor polygon, for a scenario.

- The ***dissolved and entrained hydrocarbon exposure*** – is determined by recording the maximum instantaneous concentrations at each grid cell.

- ***Maximum total volume ashore*** (found in shoreline statistics table) – Is the total volume of oil stranded on the shorelines throughout the duration of the simulation.

- ***Maximum instantaneous peak volume ashore*** (found in the deterministic analysis section and derived from the histogram) – Is the peak volume of oil accumulated on shorelines at a single point in time. This peak value does not include oil that came ashore earlier in the simulation and was subsequently lost through evaporation or other weathering processes.

10.2 Receptors Assessed

A range of environmental receptors and shorelines were assessed for floating oil exposure, shoreline accumulation and water column exposure as part of the study (see Figure 10-1 to Figure 10-11). Receptor categories (see Table 10-1) include sections of shorelines which are defined by local government areas (LGAs), sub-LGAs and offshore islands. All other sensitive receptors other than submerged reefs, shoals and banks (RSB) were sourced from Australian Government Department of Climate Change, Energy, the Environment and Water (http://www.environment.gov.au/).

Risks of exposure were separately calculated for each sensitive receptor area and have been tabulated.

Table 10-2 summarises the receptors that the release location resides within.

Table 10-1 Summary of receptors used to assess floating oil, shoreline and in-water exposure to hydrocarbons.

Receptor Category	Acronym	Hydrocarbon Exposure Assessment			Figure reference
		Water Column	Floating oil	Shoreline	
Australian Marine Park	AMP	✓	✓	×	Figure 10-1
Integrated Marine and Coastal Regionalisation Areas	IMCRA	✓	✓	×	Figure 10-2
Marine National Park	MNP	✓	✓	×	Figure 10-3
Marine Park	MP	✓	✓	×	Figure 10-4
Nature Reserve	NR	✓	✓	×	Figure 10-5
Ramsar	Ramsar	✓	✓	✓	Figure 10-6
Reefs, Shoals and Banks	RSB	✓	✓	×	Figure 10-7
Key Ecological Feature	KEF	✓	✓	×	Figure 10-8
State Waters	State Waters	✓	✓	×	
Local Government Areas	LGA	✓ (Reported as: Nearshore Waters)	✓ (Reported as: Nearshore Waters)	✓ (Reported as: Shore)	Figure 10-9 to Figure 10-11

Table 10-2 Summary of the receptors that the Bass 4 release location resides within.

Receptor Type	Receptor Name
BIA	Black-browed Albatross - Foraging
	Bullers Albatross - Foraging
	Campbell Albatross - Foraging
	Common Diving-petrel - Foraging
	Indian Yellow-nosed Albatross - Foraging
	Pygmy Blue Whale - Distribution
	Pygmy Blue Whale - Foraging
	Short-tailed Shearwater - Foraging
	Shy Albatross - Foraging
	Southern Right Whale - Known Core Range
	Wandering Albatross - Foraging
	White Shark - Distribution
	White-faced Storm-petrel - Foraging
IMCRA	Central Bass Strait

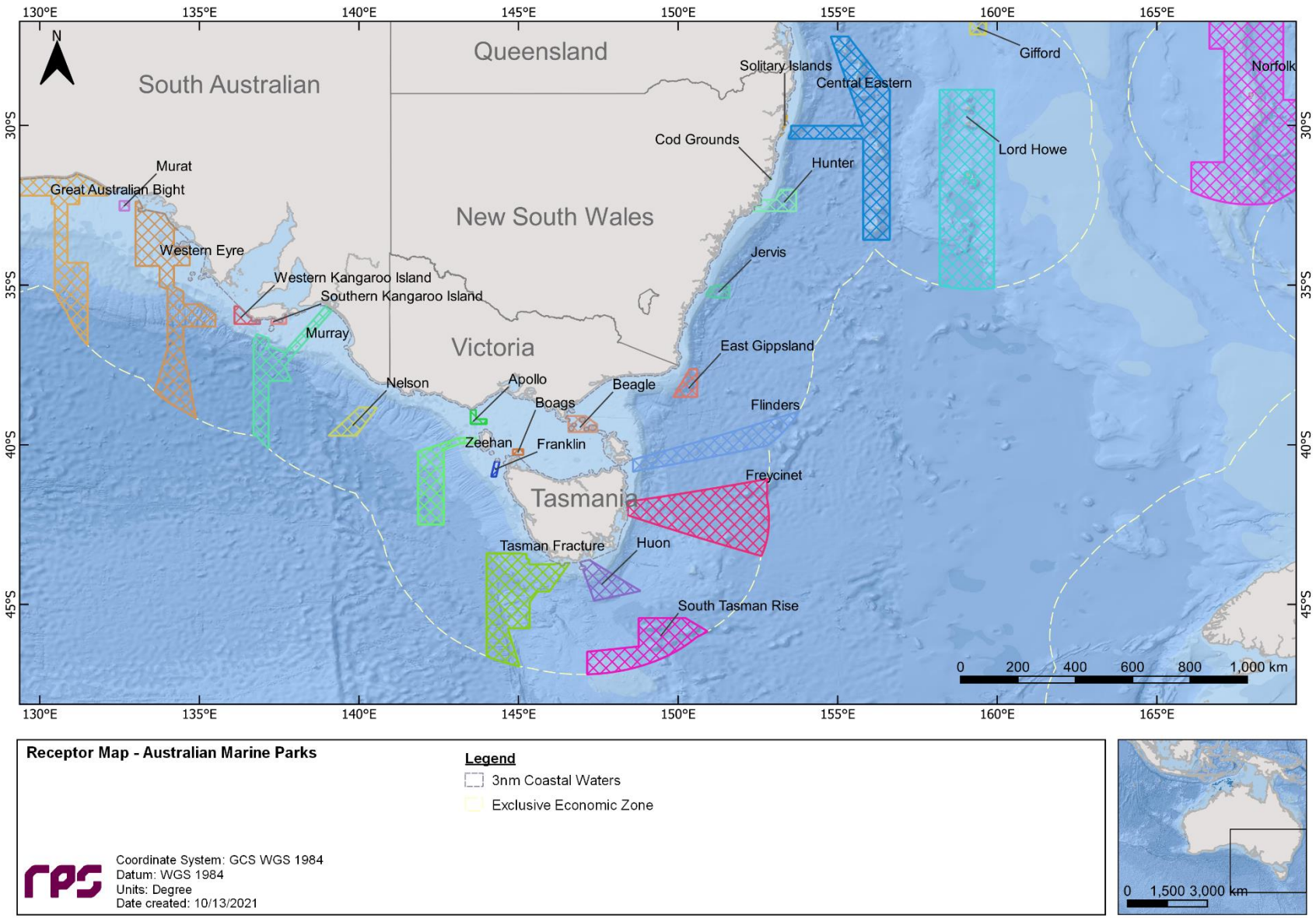

Figure 10-1 Receptor map for Australian Marine Parks (AMP).

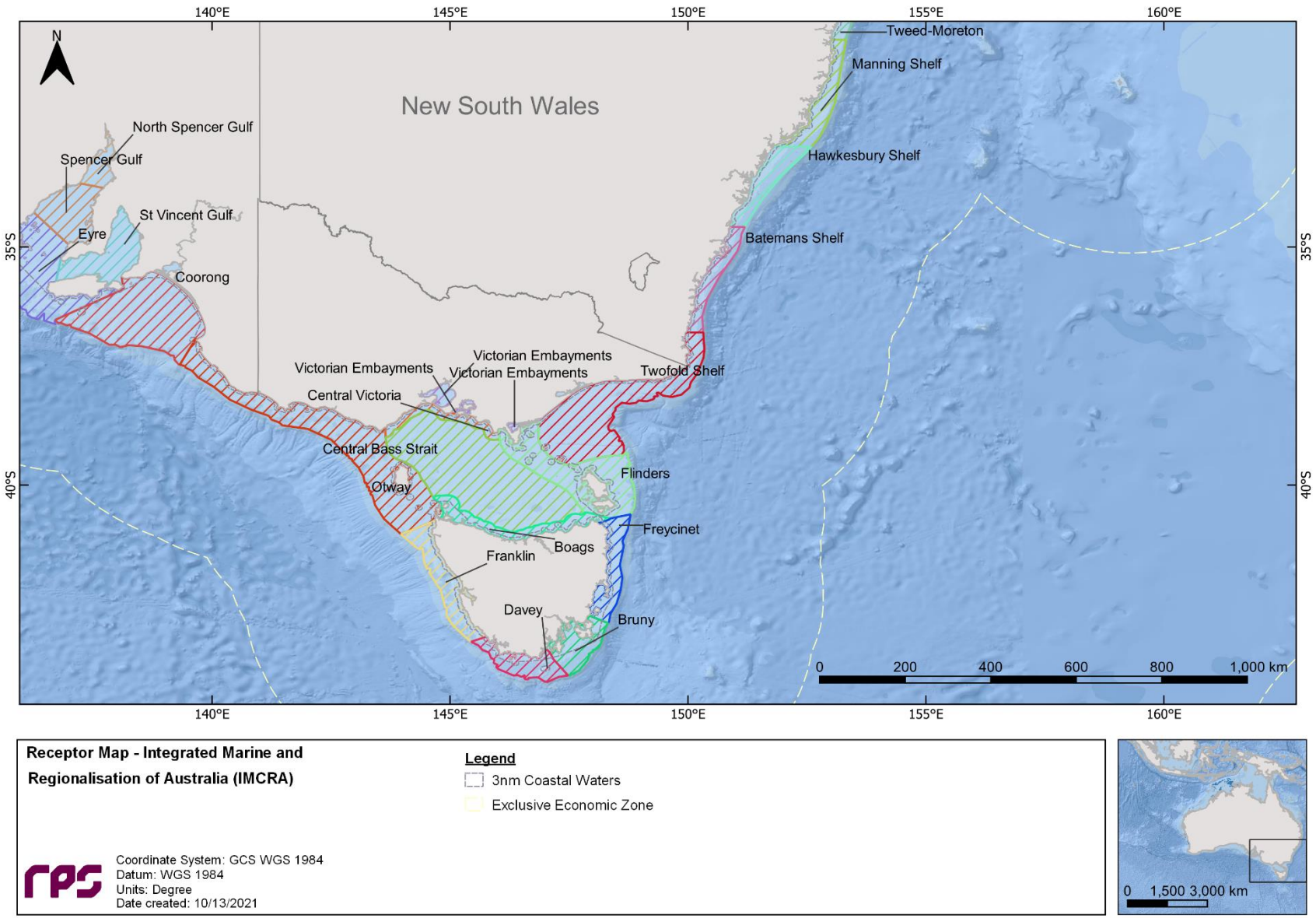

Figure 10-2 Receptor map for integrated marine and coastal regionalisation (IMCRA) areas.

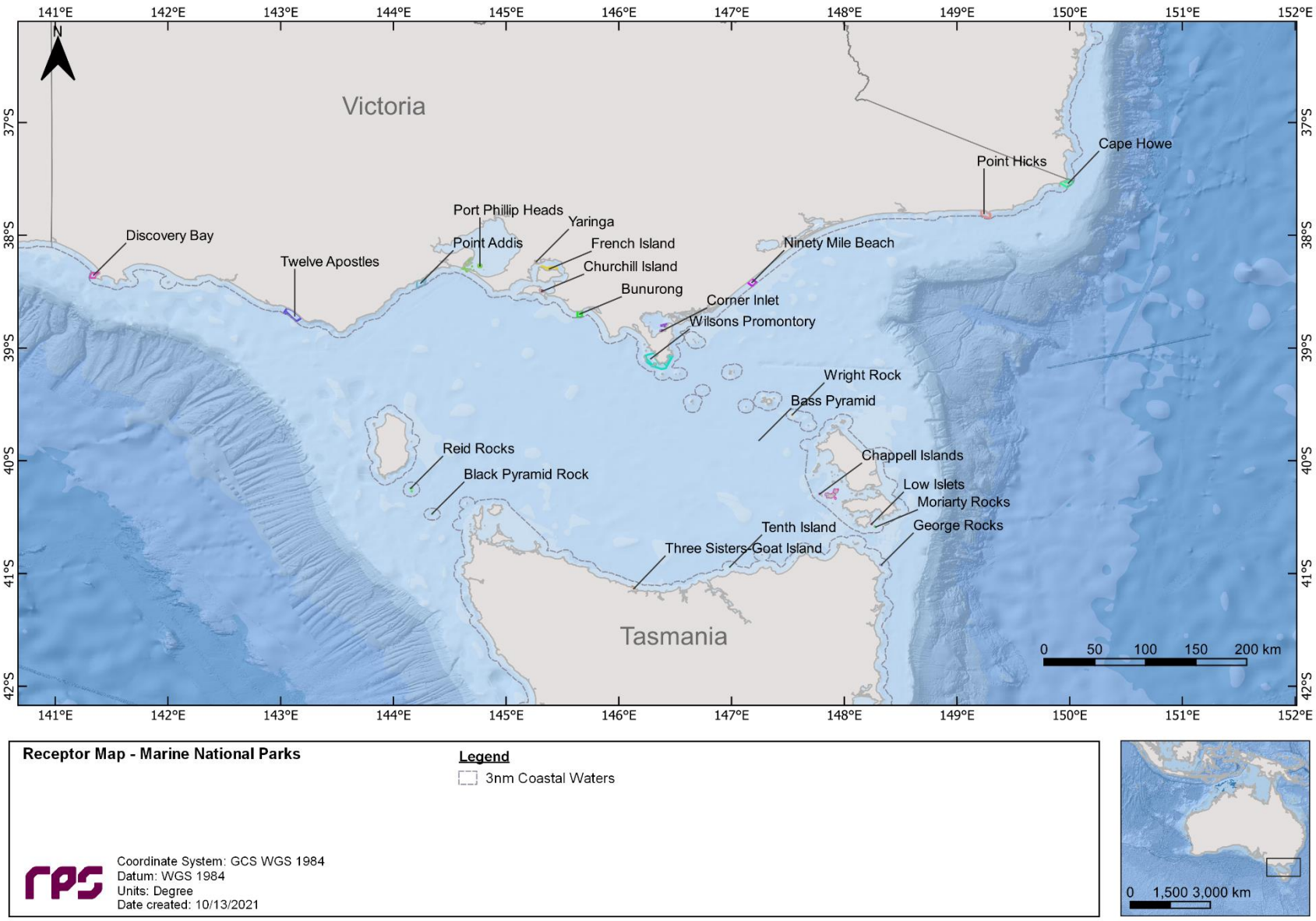

Figure 10-3 Receptor map for Marine National Parks (MNP).

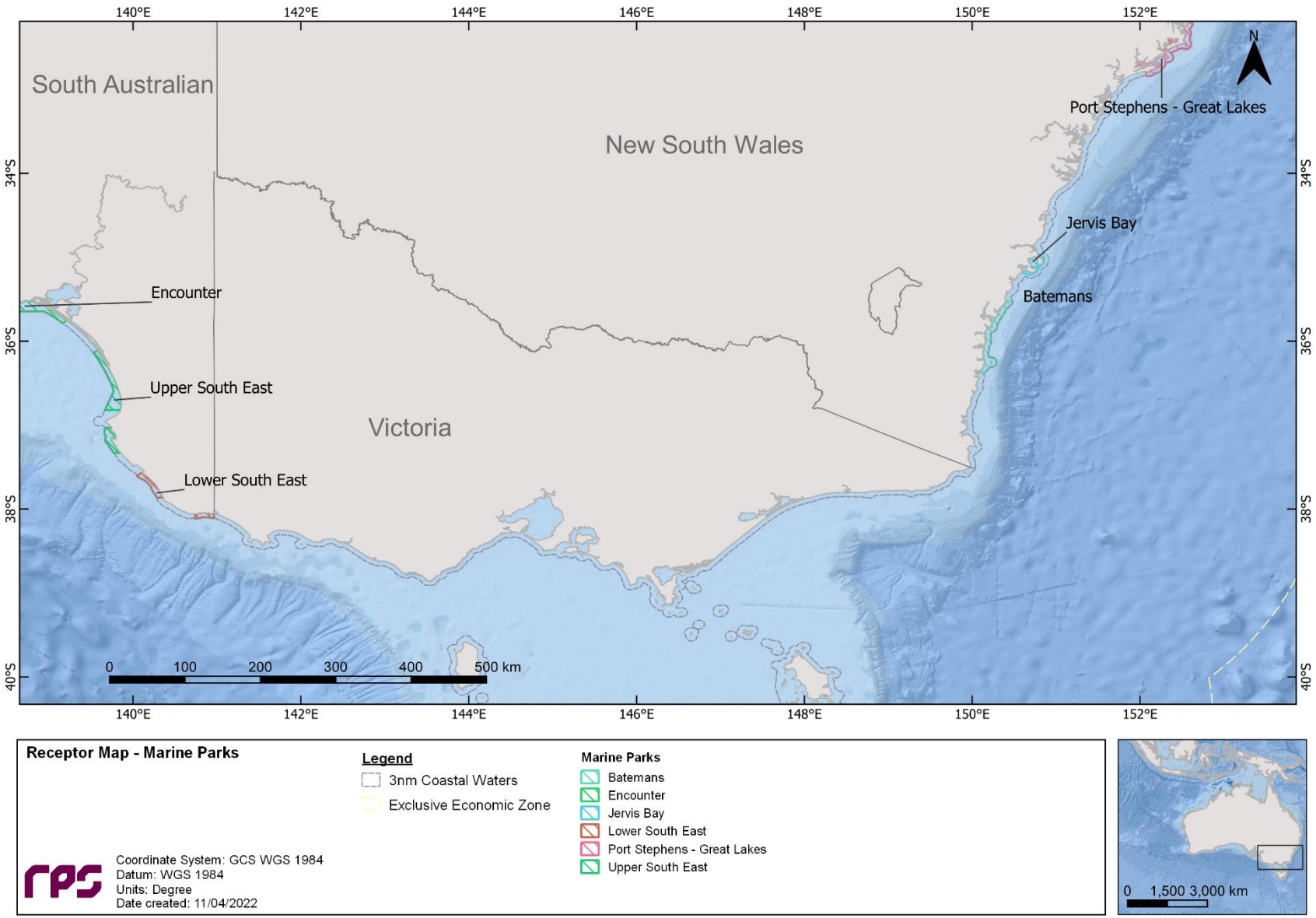

Figure 10-4 Receptor map for Marine Parks (MP).

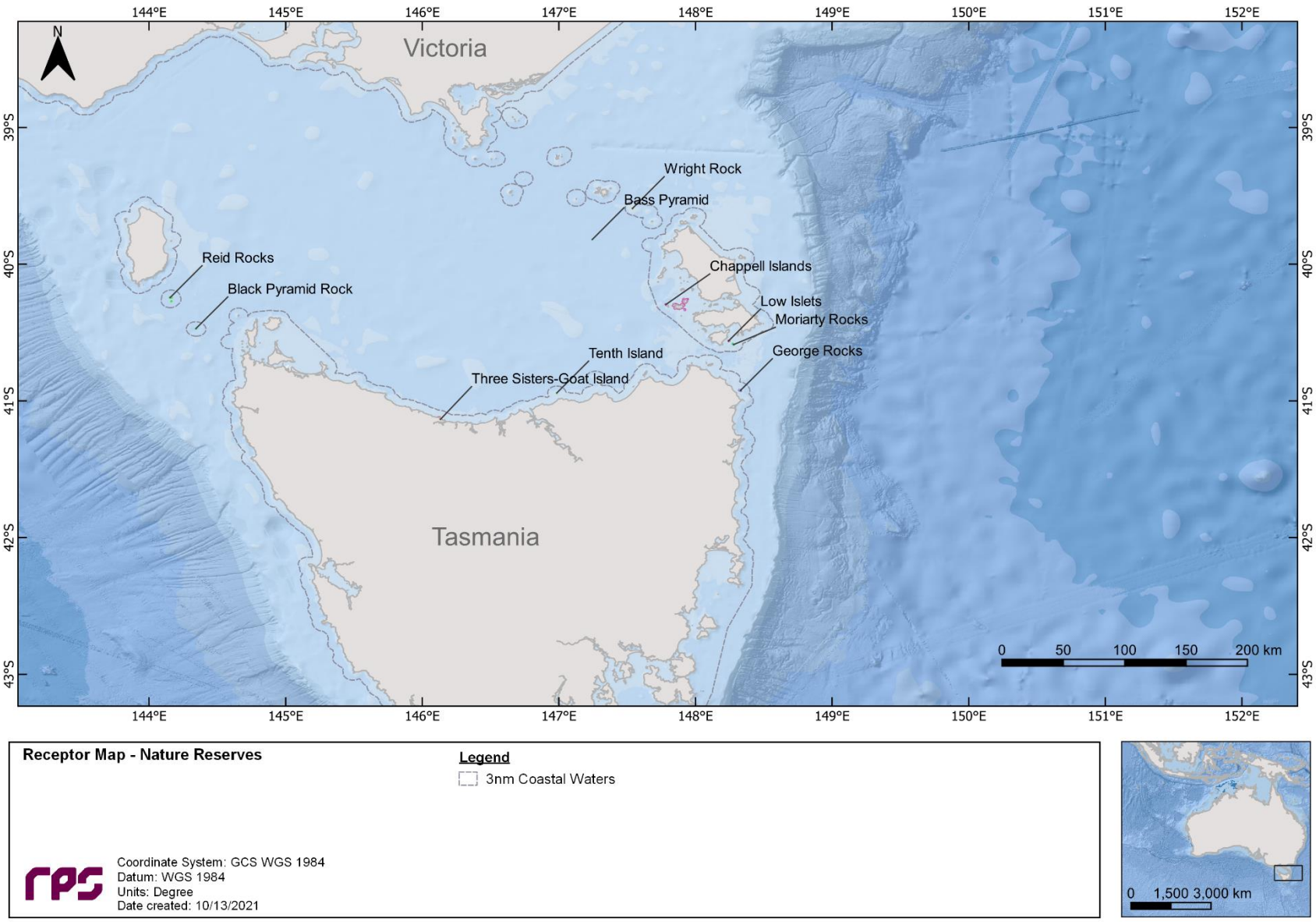

Figure 10-5 Receptor map for Nature Reserves (NR).

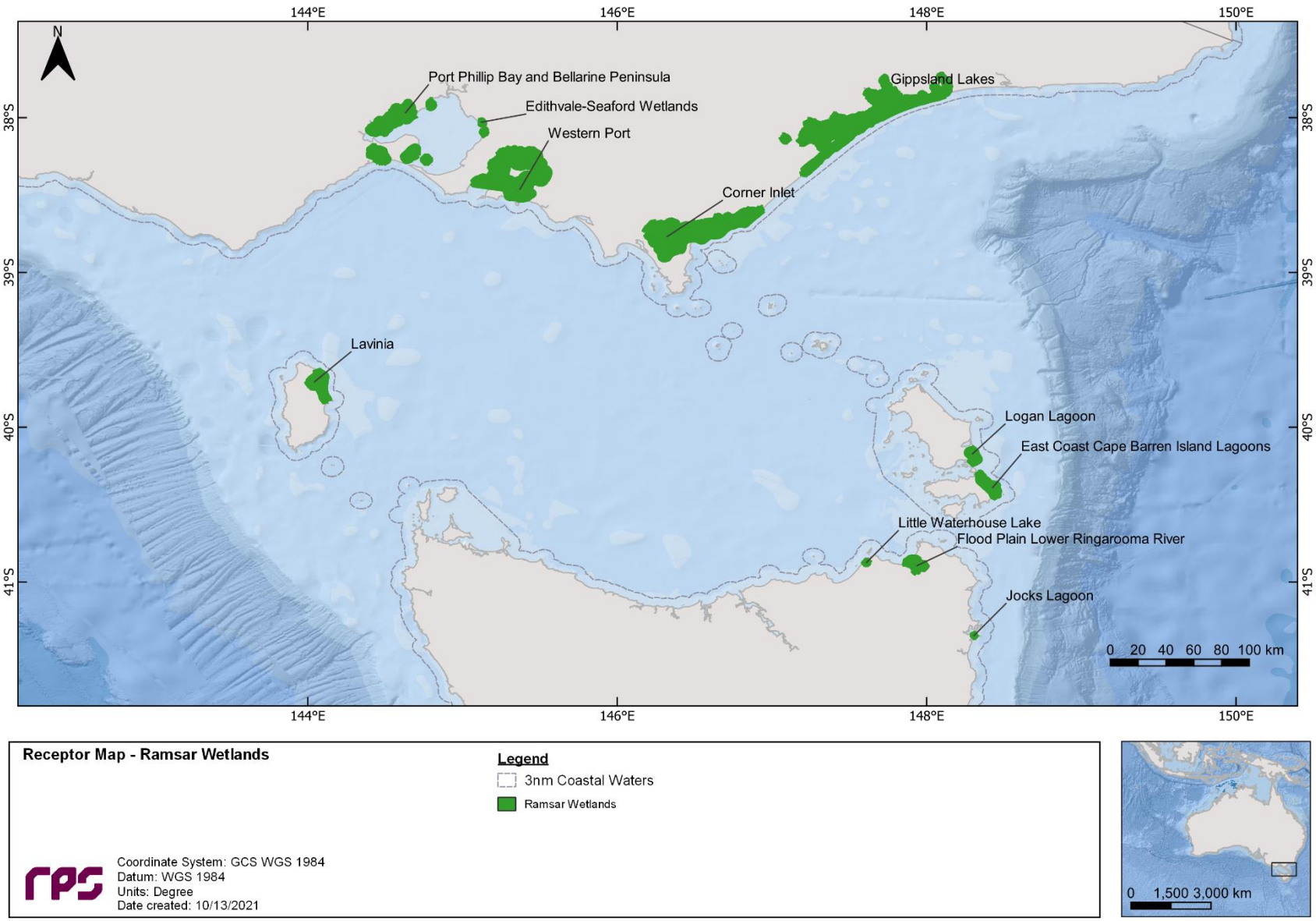

Figure 10-6 Receptor map for Ramsar Sites (Ramsar).

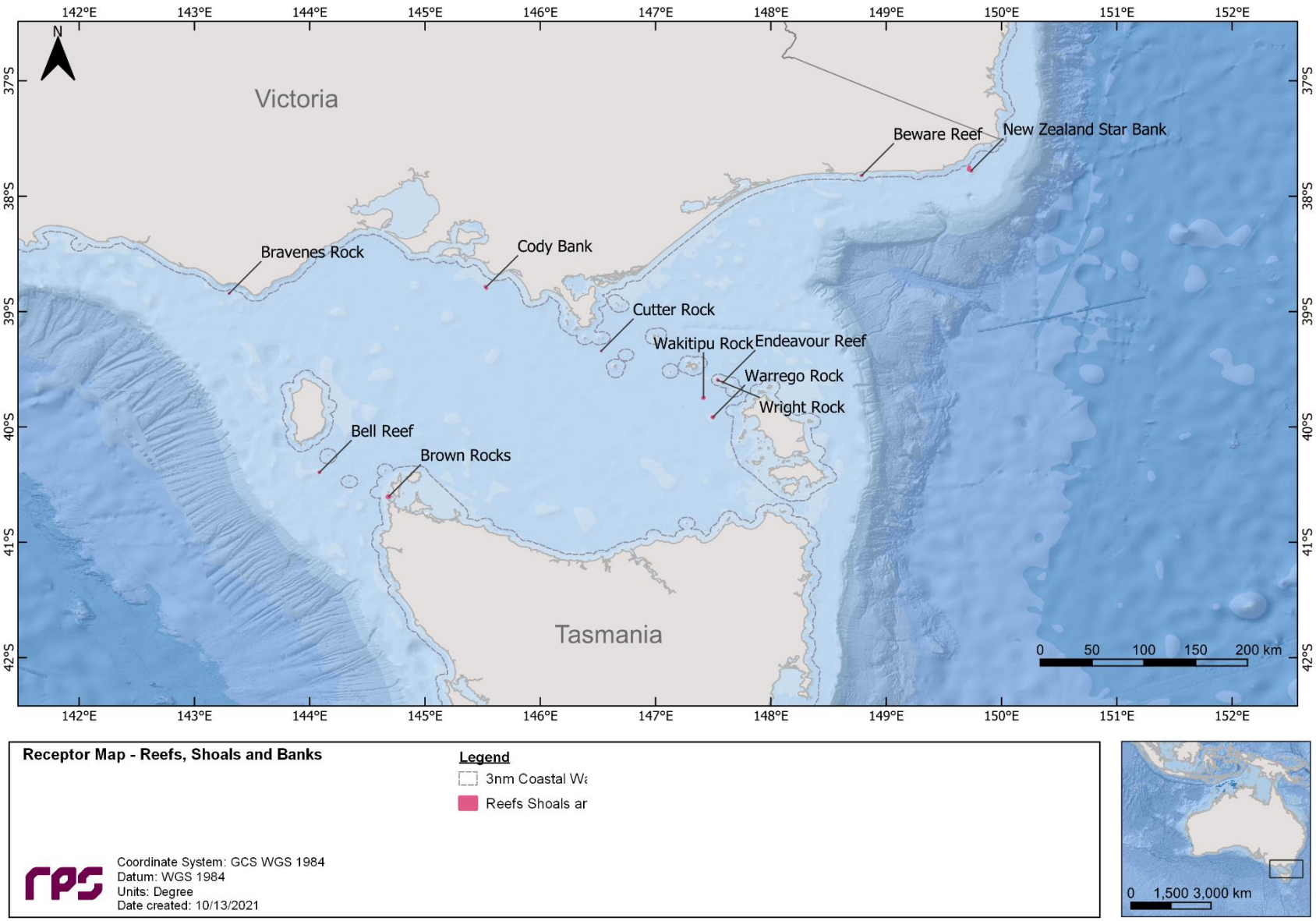

Figure 10-7 Receptor map for Reefs, Shoals and Banks (RSB).

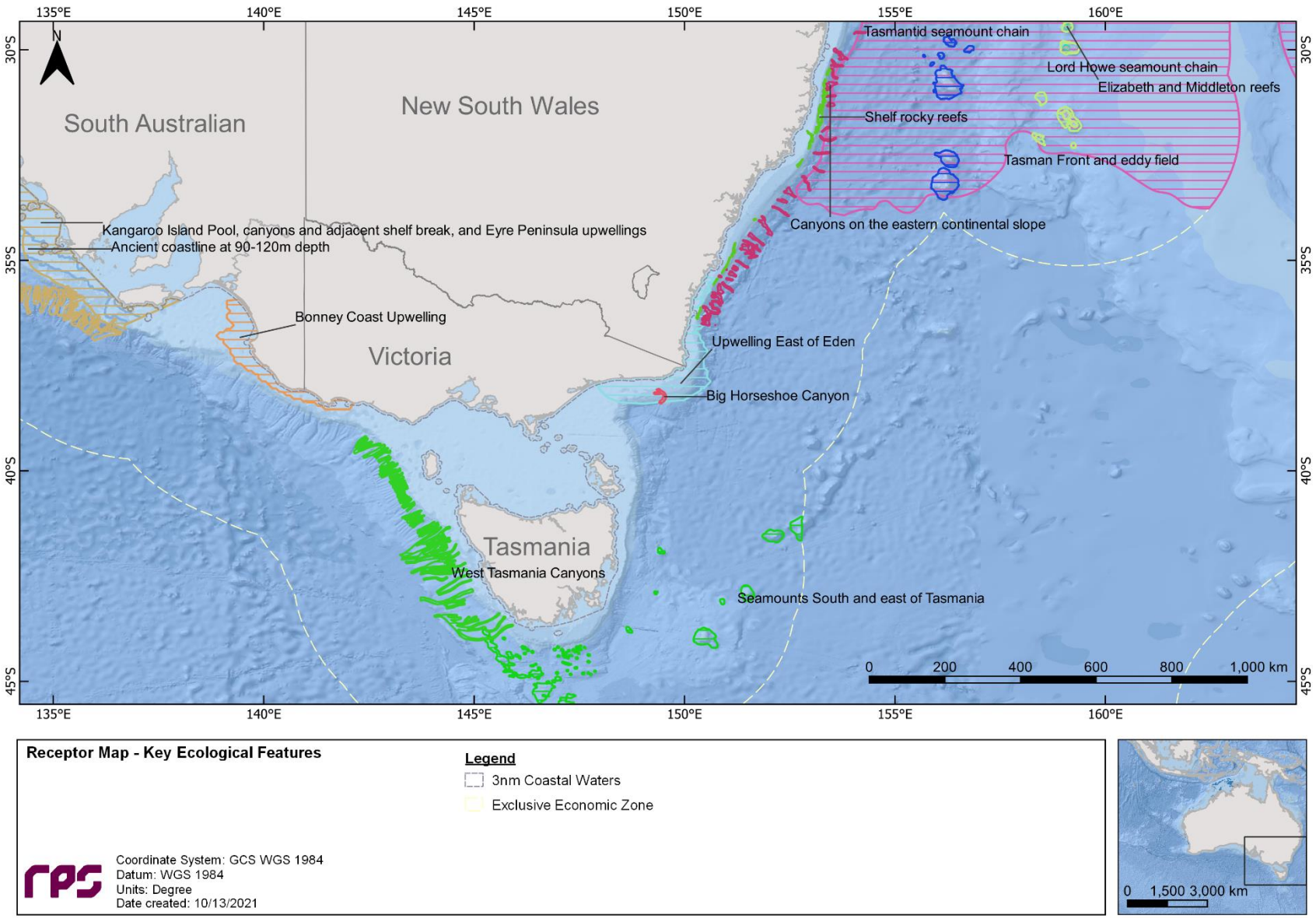

Figure 10-8 Receptor map for Key Ecological Features (KEF).

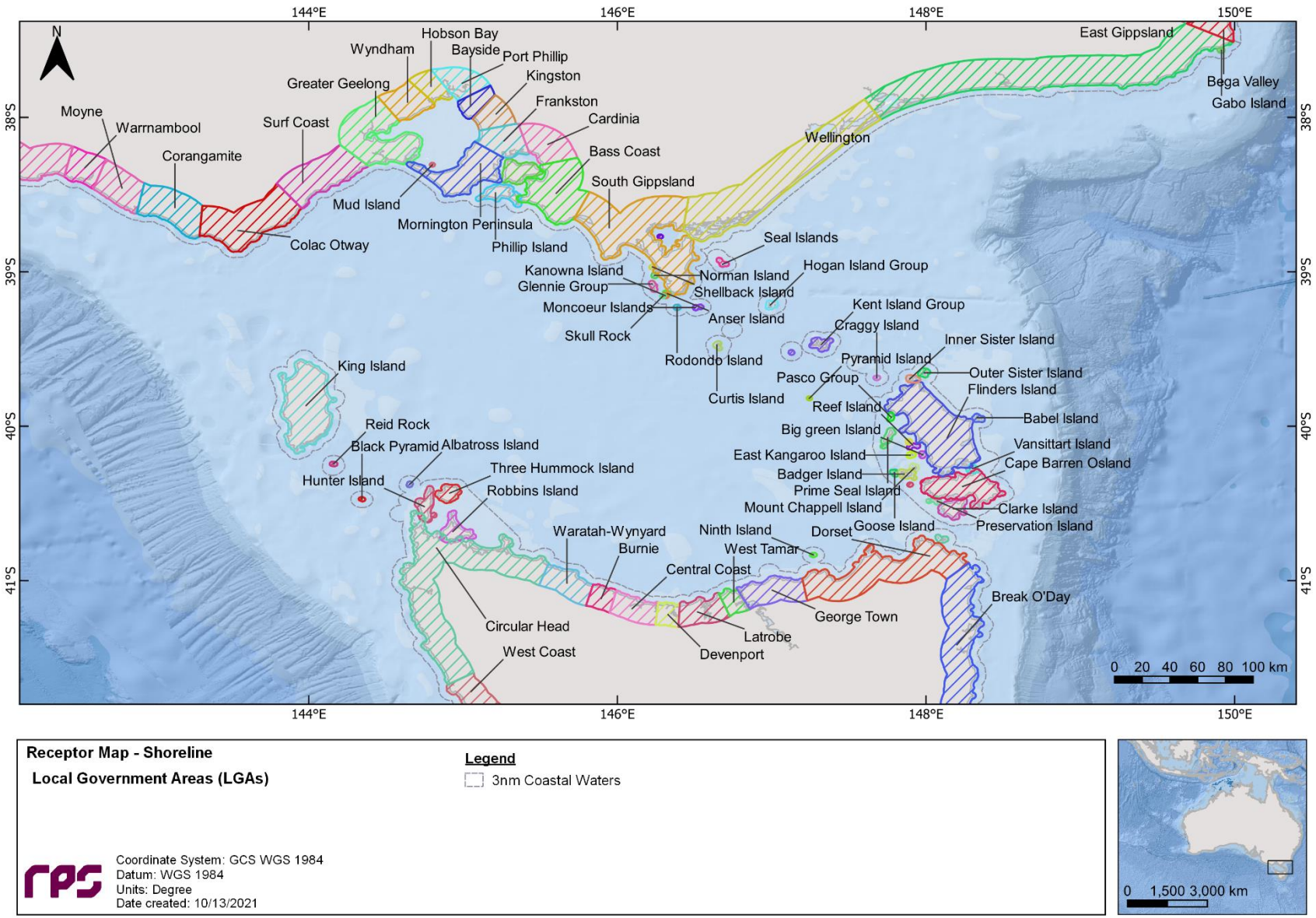

Figure 10-9 Receptor map for shorelines (1 of 3).

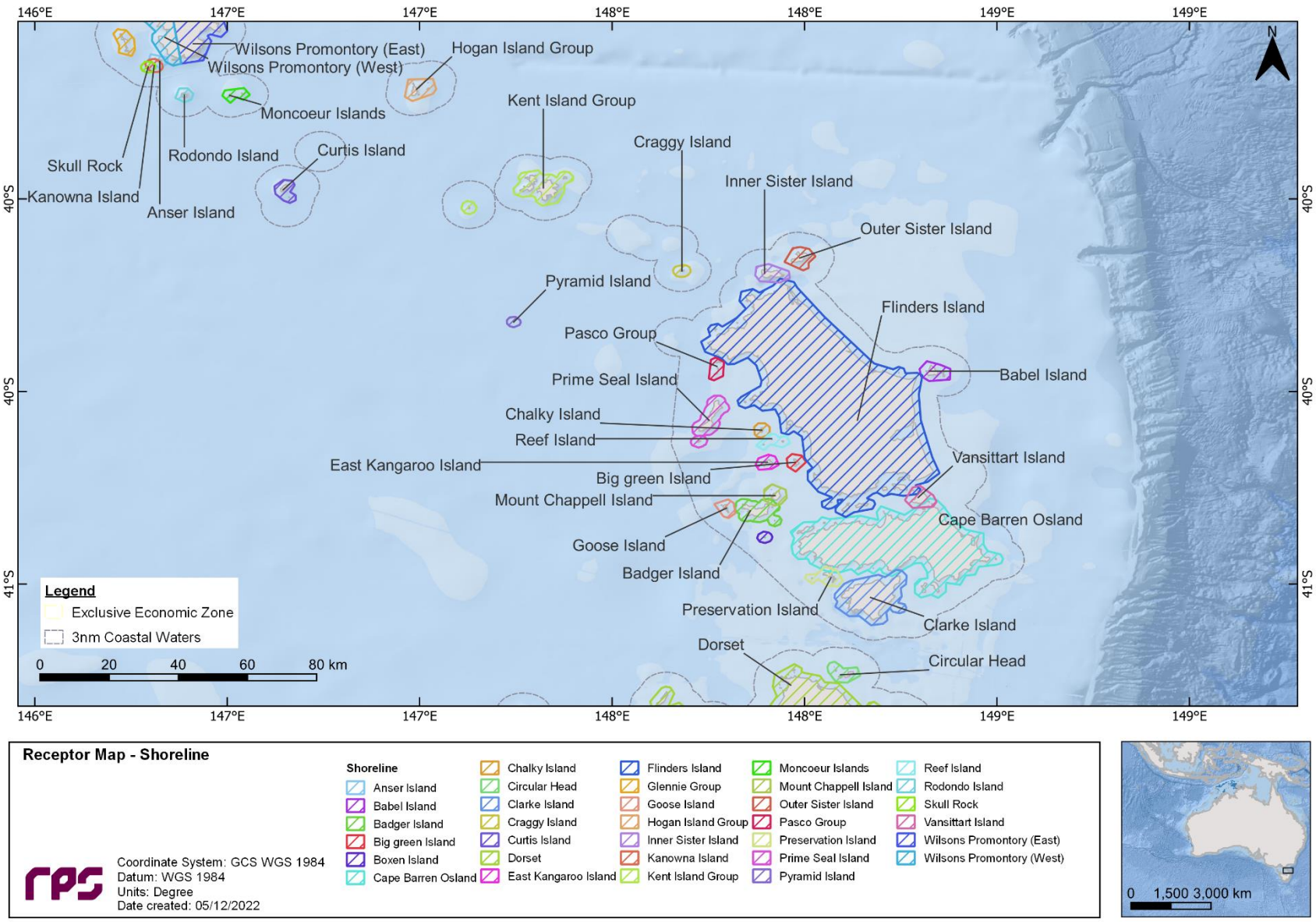

Figure 10-10 Receptor map for shorelines (2 of 3).

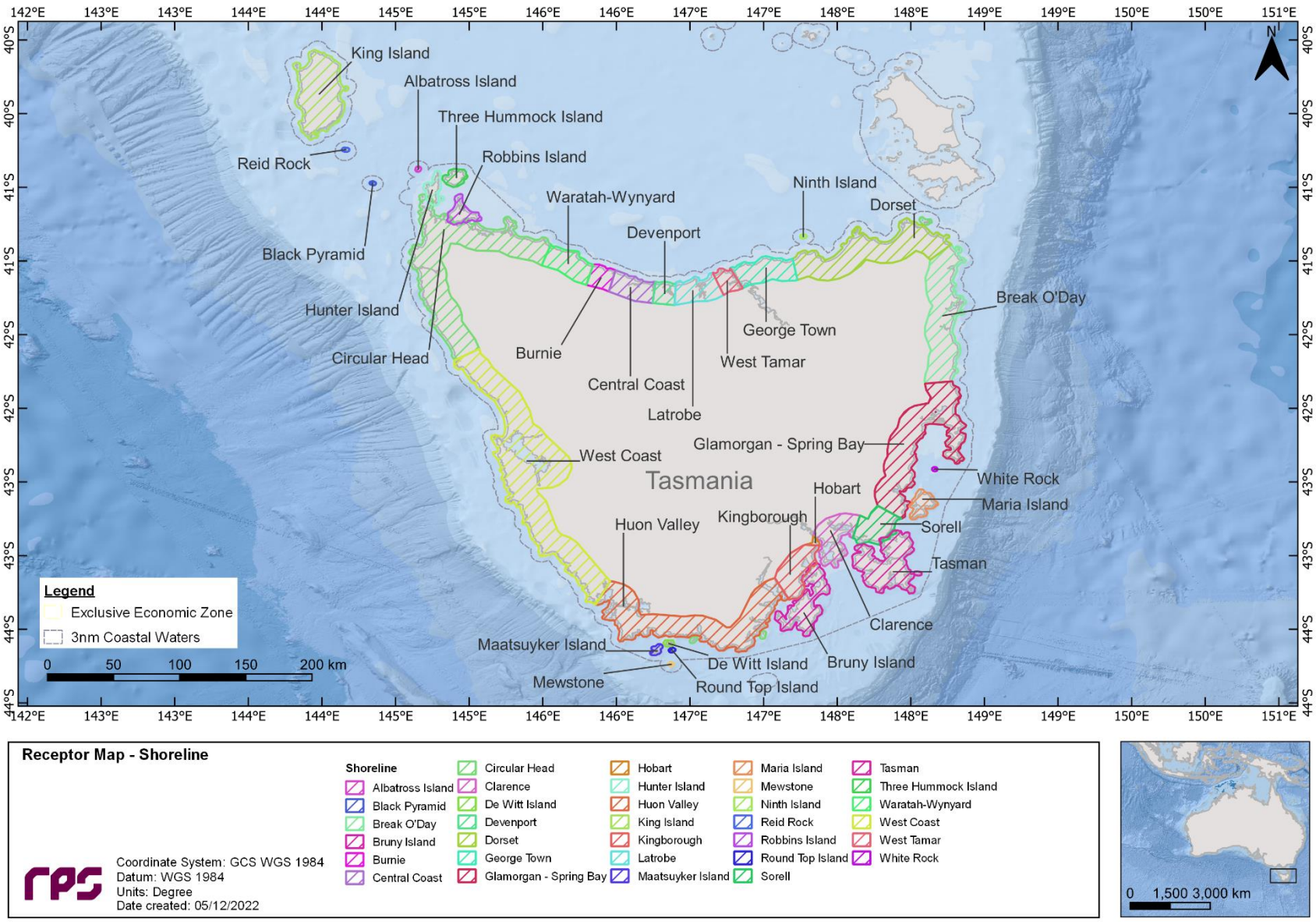

Figure 10-11 Receptor map for shorelines (3 of 3).

11 RESULTS – LOSS OF WELL CONTROL AT BASS 4

This scenario examined a 1,177,496.54 bbl (~187,207 m^3) subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. A total of 200 spill simulations were run (i.e., 100 spills per season) and tracked for 100 days. The results for all 100 simulations per season were combined and are presented on a seasonal basis (i.e., summer and winter).

11.1 Area of Exposure

Figure 11-1 presents the combined area of potential exposure for surface, shoreline, entrained and dissolved, by overlaying the results from all 200 simulations (i.e., 100 per season) during summer and winter conditions.

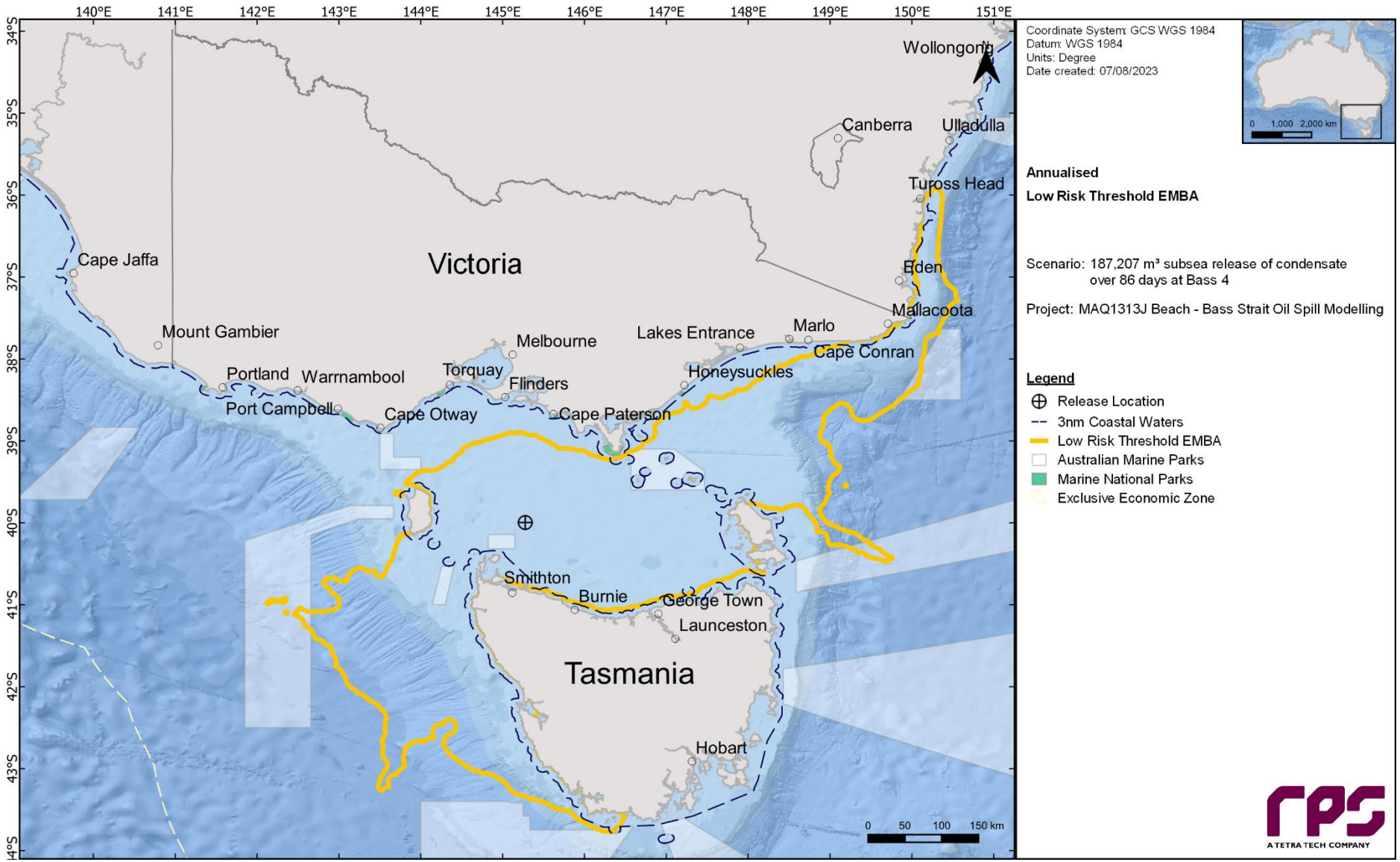

Figure 11-1 **Predicted area of exposure for low thresholds produced by overlaying the results from all 200 simulations, resulting from a 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location during summer and winter conditions.**

11.2 Floating Oil Exposure

Table 11-1 summarises the maximum distance travelled by floating oil on the sea surface at each threshold. The maximum distance from the release location to the low (1–10 g/m^2), moderate (10–50 g/m^2) and high (>50 g/m^2) exposure zones was 307 km (south), 88 km (southwest) and 17 km (north-northwest) all during winter conditions, respectively.

Table 11-2 summarises the potential floating oil exposure to individual receptors during the summer and winter conditions. Outside of the receptors that the Bass 4 release location resides within (refer to Table 10-2), the Boags AMP revealed the highest probabilities (98% summer and 83% winter) of having floating oil reaching the low threshold.

Table 11-3 presents the maximum residence time of floating oil exposure for each individual grid cell within each individual receptor during summer and winter.

Figure 11-2 and Figure 11-3 present the zones of potential floating oil exposure for all thresholds under summer and winter conditions, respectively.

Figure 11-4 to Figure 11-7 present the maximum residence time of floating oil exposure for the NOPSEMA thresholds during summer and winter, respectively.

Table 11-1 Maximum distance and direction from the release location to the edge of floating oil exposure. Results are based on a 187,207 m^3 subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations per season.

Season	Distance and direction travelled	Zones of potential floating oil exposure		
		Low	Moderate	High
Summer	Maximum distance (km) from release location	304	57	16
	Maximum distance (km) from release location (99th percentile)	101	53	12
	Direction	S	ENE	SW
Winter	Maximum distance (km) from release location	307	88	17
	Maximum distance (km) from release location (99th percentile)	94	26	13
	Direction	S	SW	NNW

Table 11-2 Summary of the potential floating oil exposure to individual receptors. Results are based on a 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March)						Winter (April to October)					
		Probability of floating oil exposure (%)			Minimum time before floating oil exposure (hours)			Probability of floating oil exposure (%)			Minimum time before floating oil exposure (hours)		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
AMP	Boags	98	1	-	26	2,114	-	83	12	-	25	37	-
	Franklin	9	-	-	121	-	-	-	-	-	-	-	-
BIA	Antipodean Albatross - Foraging	25	-	-	43	-	-	7	-	-	52	-	-
	Australasian Gannet - Foraging	63	-	-	1	1	4	22	1	-	1	1	3
	Black-browed Albatross - Foraging*	100	100	100	119	-	-	100	100	100	1,205	-	-
	Black-faced Cormorant - Foraging	39	-	-	55	-	-	17	1	-	115	2,360	-
	Bullers Albatross - Foraging*	100	100	100	-	-	-	100	100	100	284	-	-
	Campbell Albatross - Foraging*	100	100	100	156	-	-	100	100	100	198	-	-
	Common Diving-petrel - Foraging*	100	100	100	231	-	-	100	100	100	420	-	-
	Indian Yellow-nosed Albatross - Foraging*	100	100	100	120	-	-	100	100	100	312	-	-
	Little Penguin - Foraging	67	-	-	-	-	-	28	1	-	425	-	-
	Pygmy Blue Whale - Distribution*	100	100	100	937	-	-	100	100	100	1,729	-	-
	Pygmy Blue Whale - Foraging*	100	100	100	44	2,133	-	100	100	100	25	2,360	-
	Pygmy Blue Whale - Known Foraging Area	76	1	-	1	1	4	47	1	-	1	1	3
	Short-tailed Shearwater - Foraging*	100	100	100	86	-	-	100	100	100	193	-	-
	Shy Albatross - Breeding	13	-	-	55	-	-	4	-	-	115	2,360	-
	Shy Albatross - Foraging*	100	100	100	1	1	4	100	100	100	1	1	3
	Soft-plumaged Petrel - Foraging	1	-	-	65	-	-	3	-	-	184	2,360	-
	Southern Right Whale - Connecting Habitat	2	-	-	1	1	4	4	-	-	1	1	3
	Southern Right Whale - Known Core Range*	100	100	100	1	1	4	100	100	100	1	1	3
	Wandering Albatross - Foraging*	100	100	100	523	-	-	100	100	100	1,591	-	-
	White Shark - Distribution*	100	100	100	1	1	4	100	100	100	1	1	3
	White Shark - Foraging	25	-	-	-	-	-	6	-	-	284	-	-
	White-faced Storm-petrel - Foraging*	100	100	100	1	1	4	100	100	100	1	1	3
IBRA	Flinders	-	-	-	96	-	-	1	-	-	198	-	-
	King Island	38	-	-	55	-	-	20	-	-	126	2,360	-
	Tasmanian West	1	-	-	1	1	4	2	-	-	1	1	3
IMCRA	Boags	94	-	-	1	1	4	44	-	-	1	1	3
	Central Bass Strait*	100	100	100	1	1	4	100	100	100	1	1	3
	Franklin	11	-	-	184	-	-	4	-	-	423	-	-
	Otway	71	-	-	1	1	4	32	1	-	1	1	3
	Twofold Shelf	-	-	-	937	-	-	2	-	-	1,205	-	-
NP	Kent Group	-	-	-	523	-	-	2	-	-	1,591	-	-
SHORE	Albatross Island	17	-	-	1	1	4	8	-	-	1	1	3
	Black Pyramid	8	-	-	63	-	-	1	-	-	126	2,360	-
	Circular Head	3	-	-	937	-	-	4	-	-	1,729	-	-
	Hunter Island	24	-	-	1	1	4	14	-	-	1	1	3
	Kent Island Group	-	-	-	1	1	4	1	-	-	1	1	3
	Three Hummock Island	-	-	-	69	-	-	1	-	-	166	-	-
	West Coast	1	-	-	1	1	4	2	-	-	1	1	3
State Waters	Tasmania State Waters	60	-	-	-	-	-	25	1	-	284	-	-

*The release location resides within the receptor boundaries.

Table 11-3 Summary of the maximum residence time of floating oil exposure for each individual grid cell within each individual receptor. Results are based on a 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March) Maximum residence time of floating oil exposure (days)			Winter (April to October) Maximum residence time of floating oil exposure (days)		
		Low	Moderate	High	Low	Moderate	High
AMP	Boags	1	< 1	-	1	< 1	-
	Franklin	< 1	-	-	-	-	-
BIA	Antipodean Albatross - Foraging	< 1	-	-	< 1	-	-
	Australasian Gannet - Foraging	< 1	-	-	< 1	< 1	-
	Black-browed Albatross - Foraging*	77	54	3	76	50	3
	Black-faced Cormorant - Foraging	1	-	-	1	< 1	-
	Bullers Albatross - Foraging*	77	54	3	76	50	3
	Campbell Albatross - Foraging*	77	54	3	76	50	3
	Common Diving-petrel - Foraging*	77	54	3	76	50	3
	Indian Yellow-nosed Albatross - Foraging*	77	54	3	76	50	3
	Little Penguin - Foraging	1	-	-	1	< 1	-
	Pygmy Blue Whale - Distribution*	77	54	3	76	50	3
	Pygmy Blue Whale - Foraging*	77	54	3	76	50	3
	Pygmy Blue Whale - Known Foraging Area	< 1	< 1	-	< 1	< 1	-
	Short-tailed Shearwater - Foraging*	77	54	3	76	50	3
	Shy Albatross - Breeding	0	-	-	0	-	-
	Shy Albatross - Foraging*	77	54	3	76	50	3
	Soft-plumaged Petrel - Foraging	< 1	-	-	< 1	-	-
	Southern Right Whale - Connecting Habitat	1	-	-	1	-	-
	Southern Right Whale - Known Core Range*	77	54	3	76	50	3
	Wandering Albatross - Foraging*	77	54	3	76	50	3
	White Shark - Distribution*	77	54	3	76	50	3
	White Shark - Foraging	< 1	-	-	< 1	-	-
	White-faced Storm-petrel - Foraging*	77	54	3	76	50	3
IBRA	Flinders	-	-	-	< 1	-	-
	King Island	1	-	-	1	-	-
	Tasmanian West	< 1	-	-	< 1	-	-
IMCRA	Boags	< 1	-	-	< 1	-	-
	Central Bass Strait*	77	54	3	76	50	3
	Franklin	< 1	-	-	< 1	-	-
	Otway	1	-	-	1	< 1	-
	Twofold Shelf	-	-	-	< 1	-	-
NP	Kent Group	-	-	-	< 1	-	-
SHORE	Albatross Island	< 1	-	-	< 1	-	-
	Black Pyramid	< 1	-	-	< 1	-	-
	Circular Head	1	-	-	1	-	-
	Hunter Island	1	-	-	1	-	-
	Kent Island Group	-	-	-	< 1	-	-
	Three Hummock Island	-	-	-	< 1	-	-
	West Coast	< 1	-	-	< 1	-	-

Receptor		Summer (November through to March) Maximum residence time of floating oil exposure (days)			Winter (April to October) Maximum residence time of floating oil exposure (days)		
		Low	Moderate	High	Low	Moderate	High
State Waters	Tasmania State Waters	1	-	-	1	< 1	-

*The release location resides within the receptor boundaries.

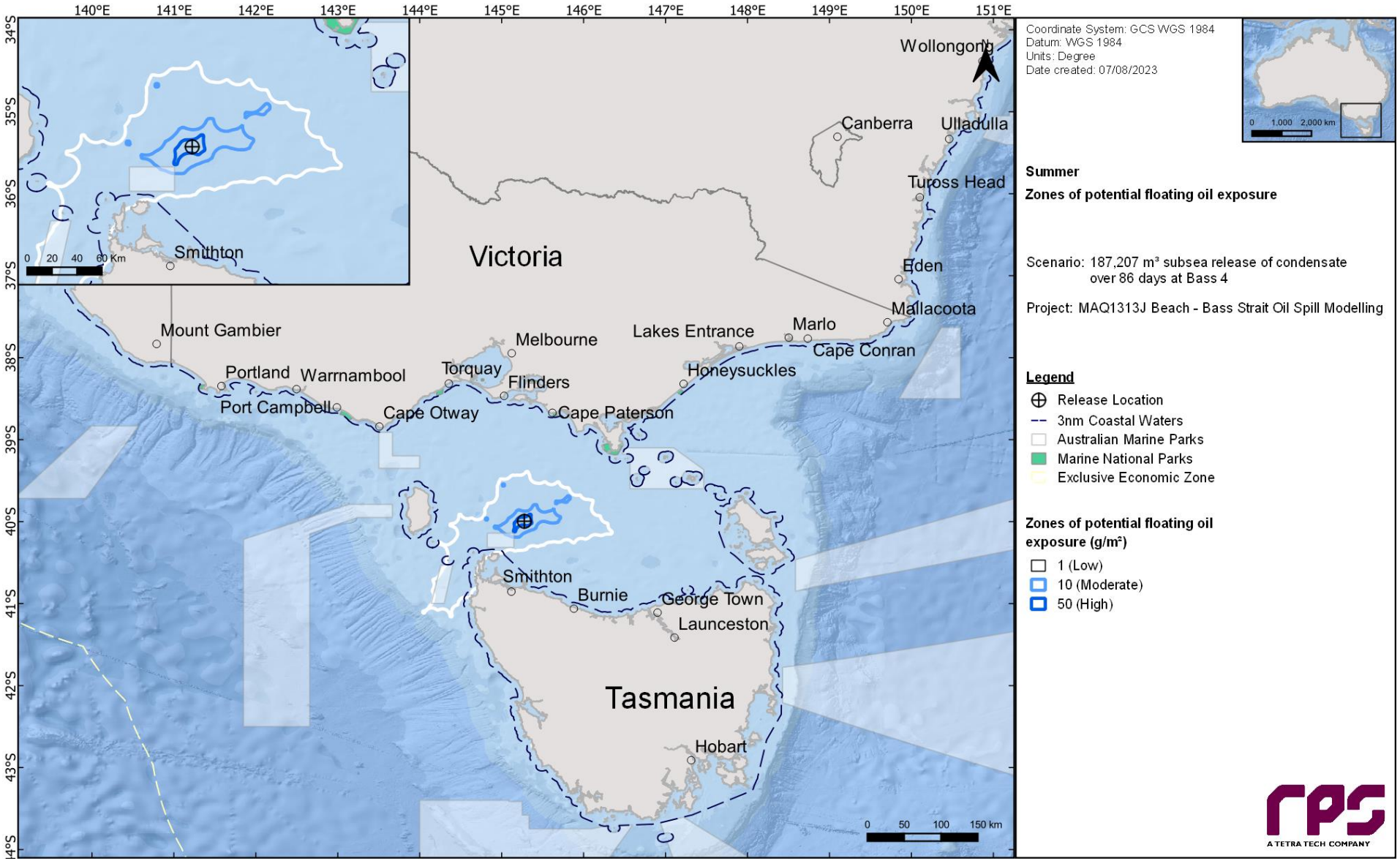

Figure 11-2 Zones of potential floating oil exposure in the event of a 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations during summer conditions.

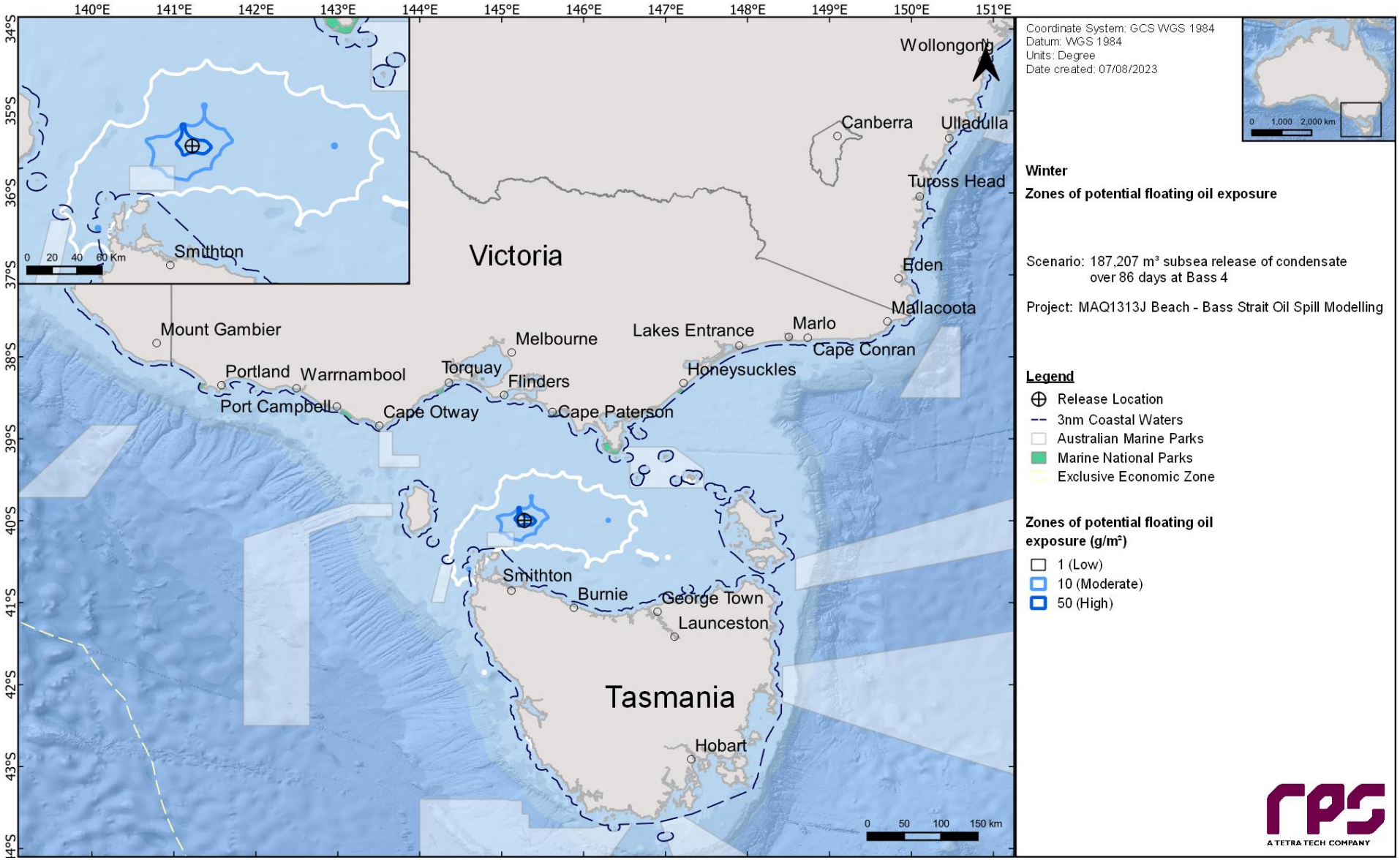

Figure 11-3 Zones of potential floating oil exposure in the event of a 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4. The results were calculated from 100 spill simulations during winter conditions.

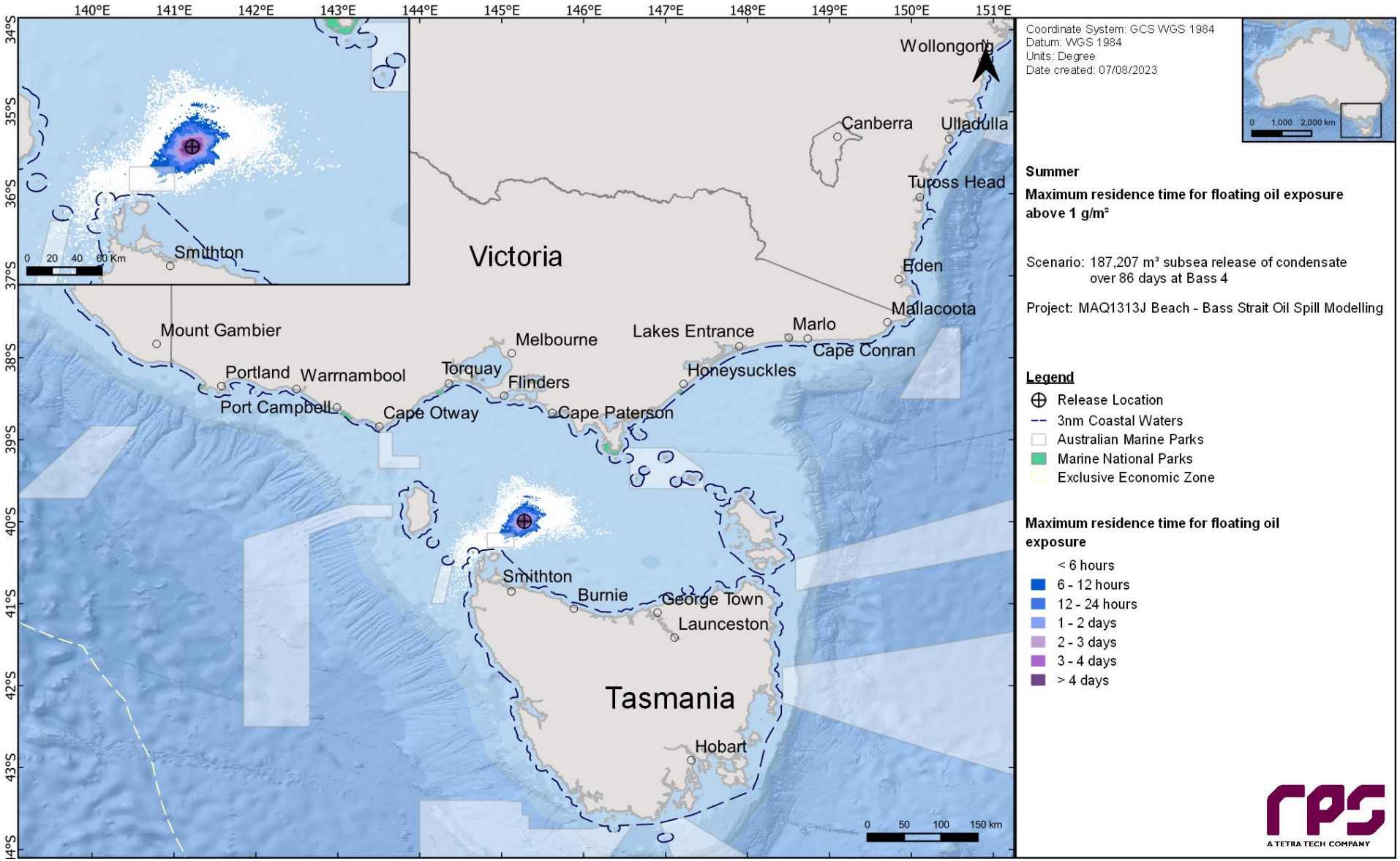

Figure 11-4 Maximum residence time of floating oil exposure above 1 g/m², in the event of 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations during summer conditions.

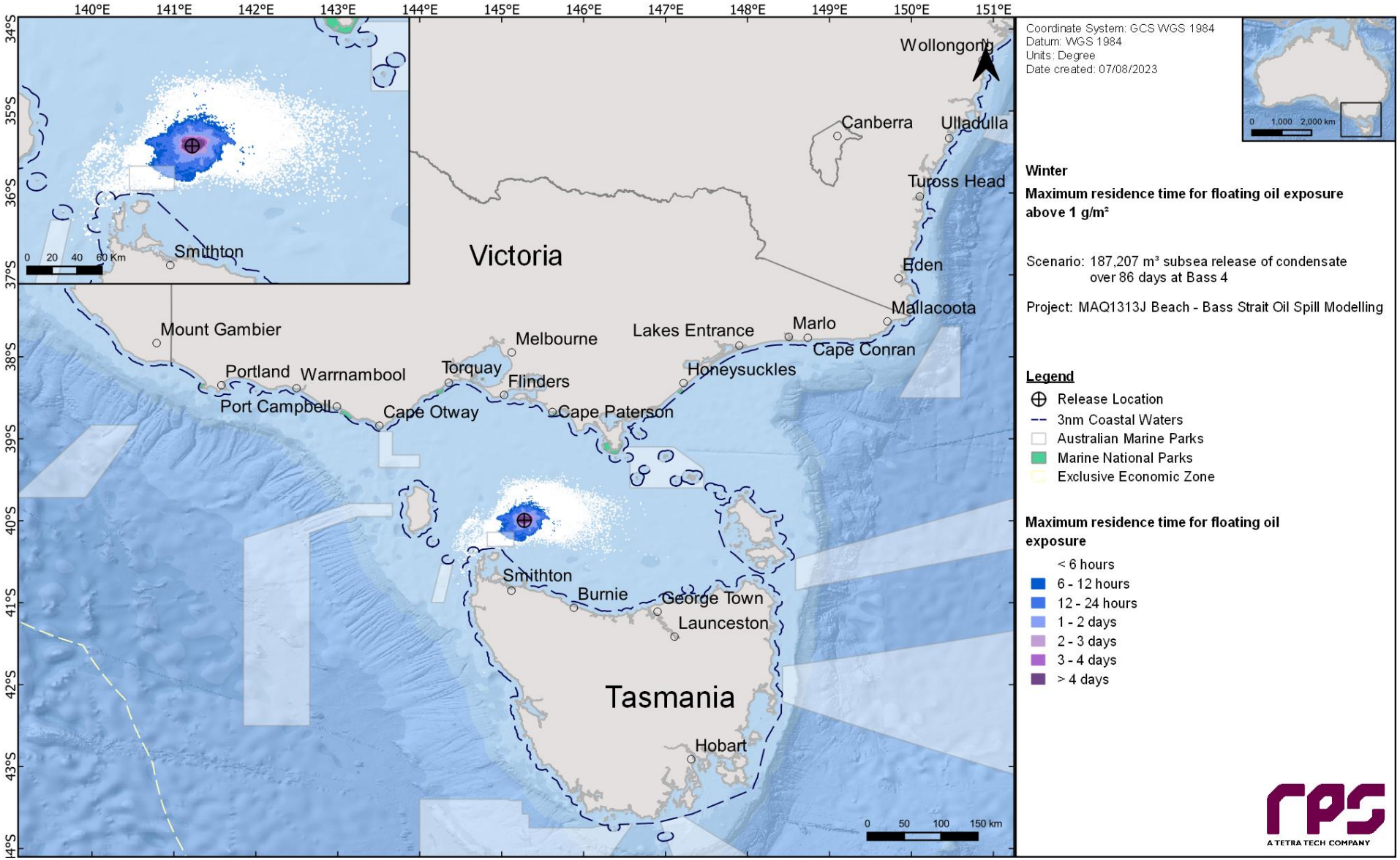

Figure 11-5 Maximum residence time of floating oil exposure above 1 g/m², in the event of 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations during winter conditions.

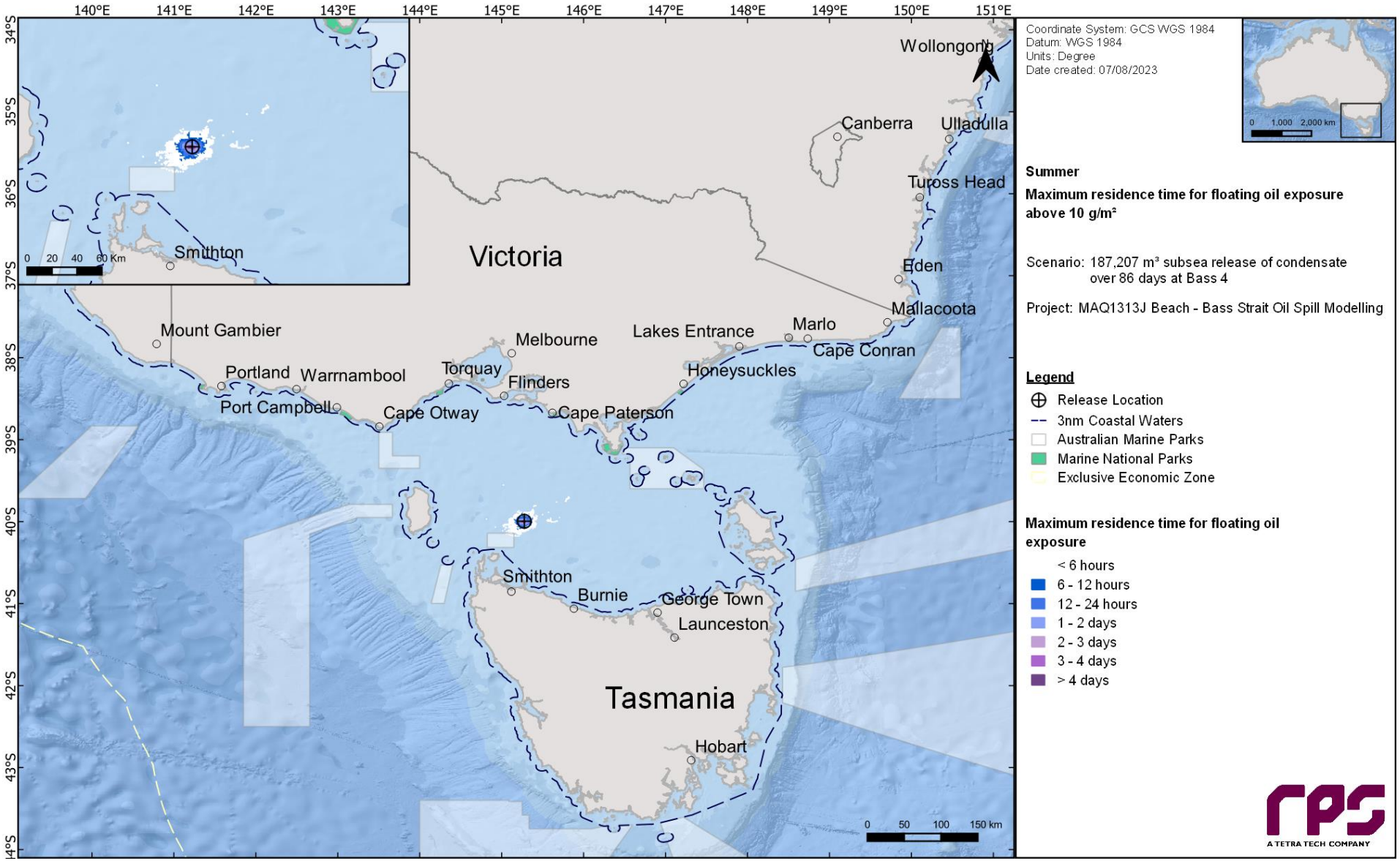

Figure 11-6 Maximum residence time of floating oil exposure above 10 g/m², in the event of 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations during summer conditions.

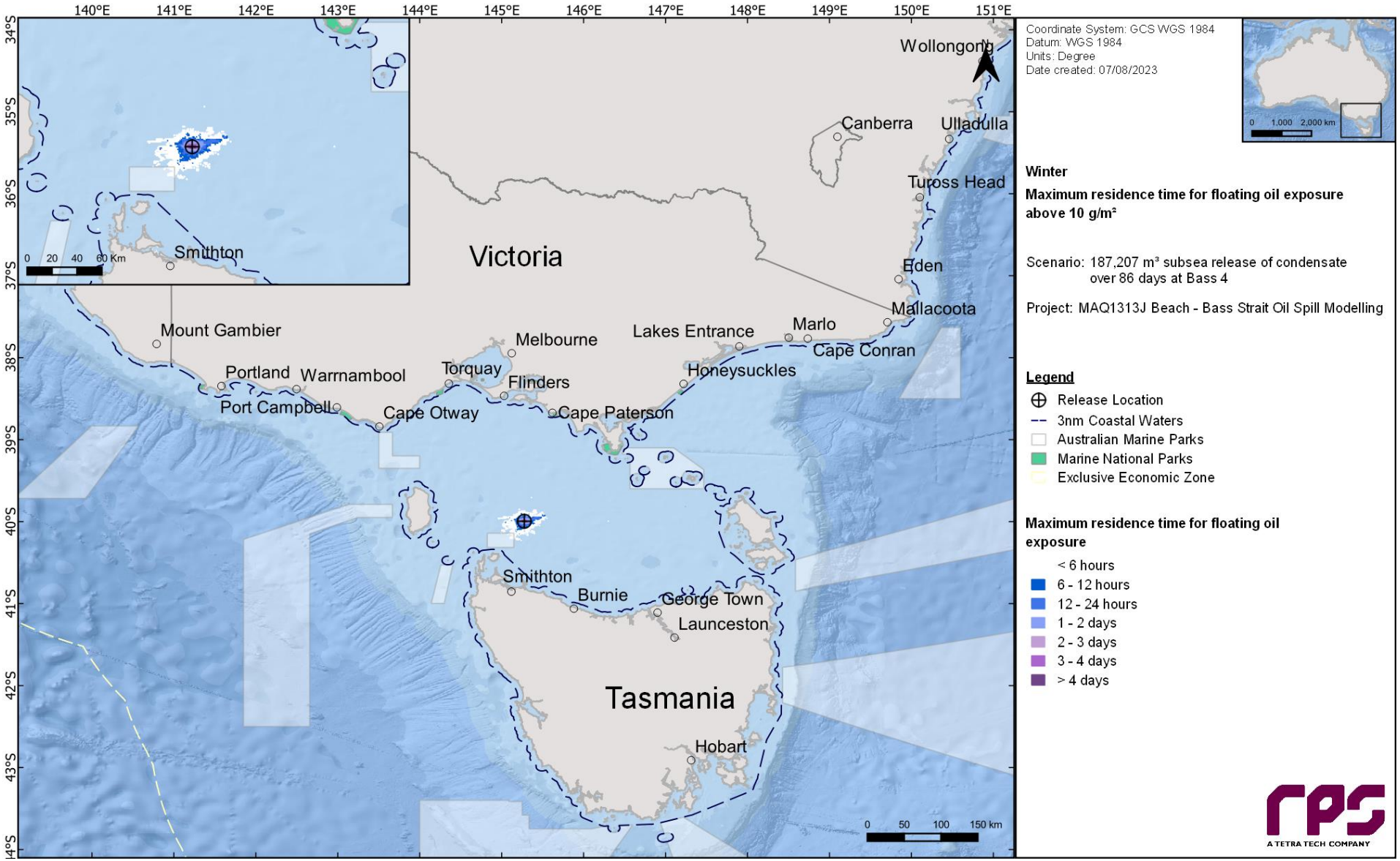

Figure 11-7 Maximum residence time of floating oil exposure above 10 g/m², in the event of 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations during winter conditions.

11.3 Shoreline Accumulation

Table 11-4 presents a summary of the predicted potential shoreline accumulation during the summer and winter conditions. The probability of accumulation to any shoreline at, or above, the low level (10 g/m^2) threshold was 89% during summer conditions and 85% during winter conditions. The minimum time before oil accumulation at, or above, the low threshold was 5 days during summer conditions, and 6 days during winter conditions. The maximum volume ashore for a single spill trajectory during both seasons was 50 m^3, whilst the maximum length of shoreline accumulation at the low threshold was 105 km and 112 km for summer and winter respectively. For the moderate threshold, the maximum length of shoreline accumulation was 2 km during summer and 1 km during winter. No accumulation at the high threshold was predicted during none of the seasons.

Table 11-5 summarises the shoreline accumulation on individual receptors during the summer and winter conditions. Hunter Island recorded the highest probability of shoreline accumulation at the low threshold during summer, with 57% and Kent Island Group during winter, with 60%.

The minimum times before shoreline accumulation above the low threshold were 5 days (summer) predicted for Hunter Island and 6 days (winter) predicted for Albatross Island.

The summer and winter conditions maximum potential shoreline loadings above the low, moderate and high shoreline thresholds are presented in Figure 11-8 and Figure 11-9, respectively.

Table 11-4 Summary of oil accumulation across all shorelines. Results are based on a 187,207 m^3 subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations per season.

Shoreline Statistics	Summer	Winter
Probability of accumulation on any shoreline (%)	89	85
Absolute minimum time for visible oil to shore (days)	5	6
Maximum total volume of hydrocarbons ashore (m^3)	50	50
Average volume of hydrocarbons ashore (m^3)	8	7
Maximum length of the shoreline at **10 g/m^2** (km)	105	112
Average shoreline length (km) at **10 g/m^2** (km)	12	11
Maximum length of the shoreline at **100 g/m^2** (km)	2	1
Average shoreline length (km) at **100 g/m^2** (km)	2	1
Maximum length of the shoreline at **1,000 g/m^2** (km)	-	-
Average shoreline length (km) at **1,000 g/m^2** (km)	-	-

Table 11-5 Summary of oil accumulation on individual shoreline receptors. Results are based on a 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations per season.

Shoreline Receptor		Summer																			Winter													
		Maximum probability of shoreline loading (%)			Minimum time before shoreline accumulation (days)			Load on shoreline (g/m²)		Volume on shoreline (m³)		Mean length of shoreline accumulation (km)			Maximum length of shoreline accumulation (km)			Maximum probability of shoreline loading (%)			Minimum time before shoreline accumulation (days)			Load on shoreline (g/m²)		Volume on shoreline (m³)		Mean length of shoreline accumulation (km)			Maximum length of shoreline accumulation (km)		
		Low	Mod	High	Low	Mod	High	Mean	Peak	Mean	Peak	Low	Mod	High	Low	Mod	High	Low	Mod	High	Low	Mod	High	Mean	Peak	Mean	Peak	Low	Mod	High	Low	Mod	High
SHORE	Albatross Island	24	-	-	10	-	-	6	54	< 1	1	1	-	-	2	-	-	12	-	-	6	-	-	5	24	< 1	1	1	-	-	2	-	-
	Badger Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	98	-	-	< 1	14	< 1	1	1	-	-	1	-	-
	Bega Valley	9	-	-	75	-	-	2	24	< 1	1	1	-	-	2	-	-	25	-	-	43	-	-	2	70	1	6	2	-	-	6	-	-
	Big green Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	99	-	-	< 1	10	< 1	< 1	1	-	-	1	-	-
	Black Pyramid	20	-	-	16	-	-	8	62	< 1	1	1	-	-	2	-	-	3	-	-	18	-	-	3	13	< 1	< 1	1	-	-	2	-	-
	Cape Barren Osland	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	99	-	-	< 1	14	< 1	1	1	-	-	1	-	-
	Chalky Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	98	-	-	1	16	< 1	< 1	1	-	-	1	-	-
	Circular Head	48	1	-	15	34	-	2	139	3	11	4	1	-	14	1	-	19	-	-	18	-	-	1	81	1	10	4	-	-	15	-	-
	Craggy Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	35	-	-	3	17	< 1	1	1	-	-	2	-	-
	Curtis Island	1	-	-	97	-	-	1	44	< 1	1	3	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	East Gippsland	3	-	-	87	-	-	< 1	16	< 1	2	1	-	-	1	-	-	16	-	-	45	-	-	2	51	1	4	3	-	-	7	-	-
	Eurobodalla	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	-	-	48	-	-	2	48	1	3	2	-	-	6	-	-
	Flinders Island	2	-	-	64	-	-	< 1	14	< 1	2	1	-	-	1	-	-	11	-	-	42	-	-	1	24	1	7	4	-	-	13	-	-
	Gabo Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	65	-	-	2	14	< 1	< 1	1	-	-	1	-	-
	Hogan Island Group	1	-	-	97	-	-	2	67	< 1	3	6	-	-	6	-	-	1	-	-	77	-	-	1	10	< 1	< 1	1	-	-	1	-	-
	Hunter Island	57	1	-	5	34	-	3	115	2	7	5	1	-	12	1	-	24	2	-	13	67	-	3	128	1	8	7	1	-	14	1	-
	Huon Valley	5	-	-	63	-	-	< 1	16	< 1	2	2	-	-	2	-	-	1	-	-	81	-	-	1	30	< 1	2	4	-	-	4	-	-
	Inner Sister Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	84	-	-	< 1	16	< 1	1	1	-	-	1	-	-
	Kent Island Group	22	-	-	33	-	-	2	52	1	2	3	-	-	5	-	-	60	-	-	18	-	-	3	70	2	5	4	-	-	10	-	-
	King Island	5	-	-	41	-	-	< 1	16	< 1	1	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Maatsuyker Island	1	-	-	97	-	-	< 1	13	< 1	< 1	1	-	-	1	-	-	1	-	-	81	-	-	3	36	1	1	3	-	-	3	-	-
	Montague Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18	-	-	41	-	-	9	77	1	3	3	-	-	5	-	-
	Outer Sister Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	83	-	-	1	13	< 1	< 1	1	-	-	1	-	-
	Prime Seal Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	70	-	-	1	30	< 1	2	3	-	-	6	-	-
	Pyramid Island	5	-	-	35	-	-	5	16	< 1	< 1	1	-	-	1	-	-	-	-	-	32	-	-	-	-	-	-	-	-	-	-	-	-
	Reid Rock	3	-	-	20	-	-	3	14	< 1	< 1	1	-	-	1	-	-	2	-	-	70	-	-	3	18	< 1	< 1	1	-	-	1	-	-
	Three Hummock Island	5	-	-	58	-	-	< 1	21	< 1	1	2	-	-	2	-	-	4	-	-	18	-	-	1	26	< 1	1	2	-	-	3	-	-
	West Coast	41	-	-	31	-	-	2	68	3	30	8	-	-	69	-	-	5	-	-	42	-	-	1	97	3	31	30	-	-	73	-	-

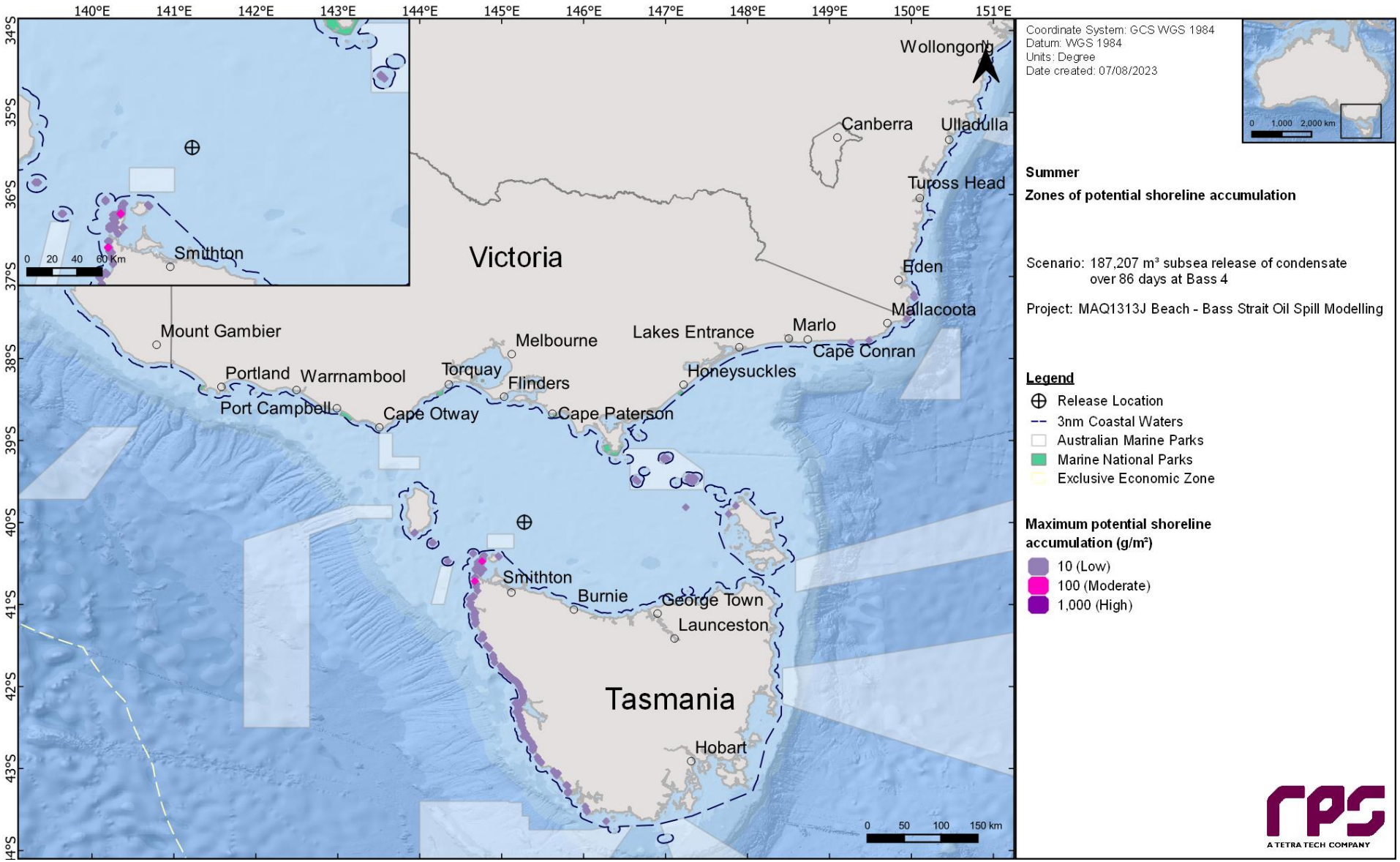

Figure 11-8 Maximum potential shoreline loading in the event of a 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations during summer conditions.

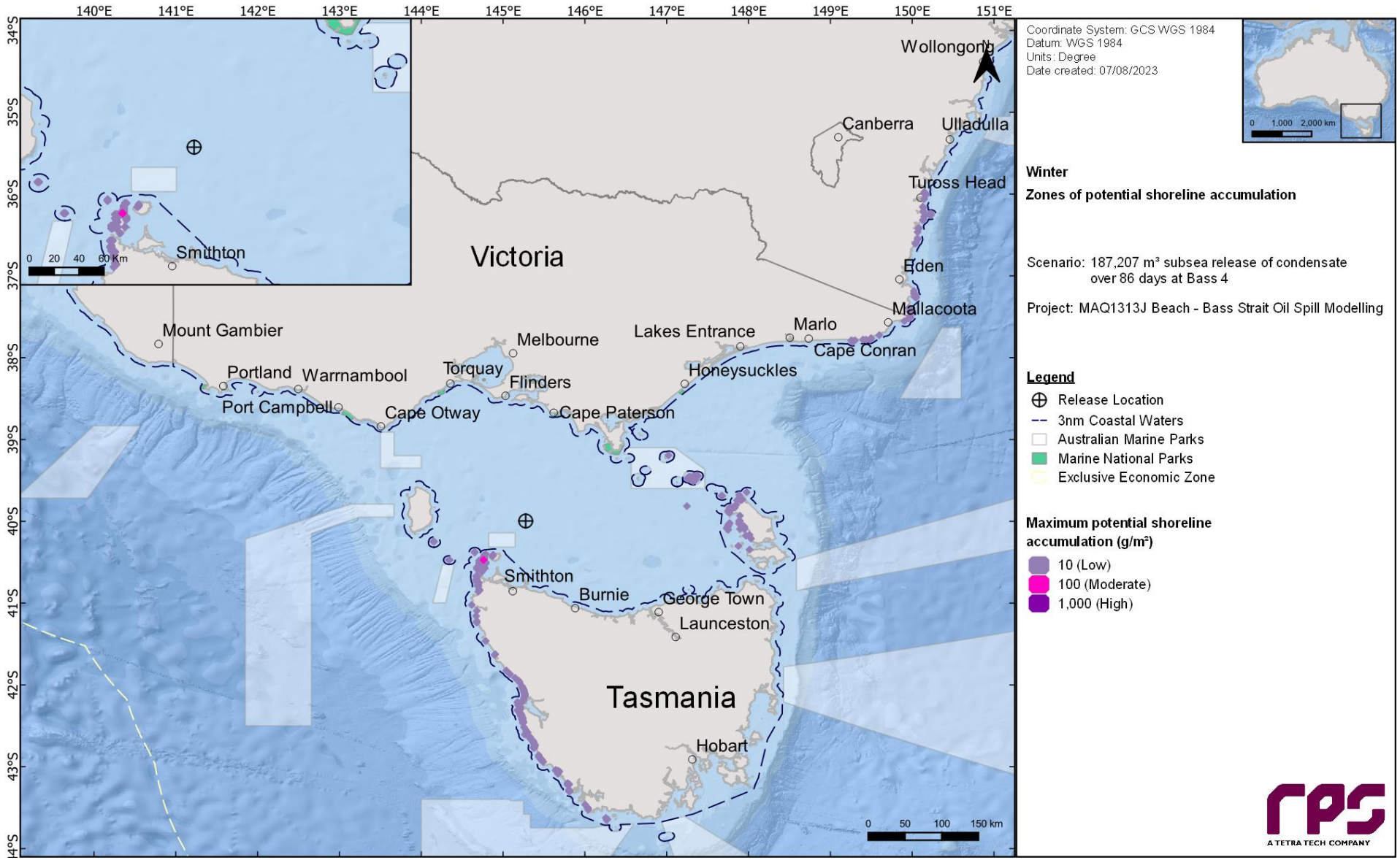

Figure 11-9 Maximum potential shoreline loading in the event of a 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations during winter conditions.

11.4 In-water exposure

11.4.1 Dissolved Hydrocarbons

Table 11-6 summarises the probability of exposure to individual receptors from dissolved hydrocarbons in the 0-10 m layer during the summer and winter conditions.

Outside of the receptors that the Bass 4 release location resides within (refer to Table 10-2), the highest concentration of dissolved hydrocarbon was predicted for the Boags AMP (1,392 ppb – summer, 1,157 ppb – winter), which also revealed 100% probability of low dissolved hydrocarbon exposure in both seasons.

Table 11-7 presents the predicted minimum time to dissolved hydrocarbon exposure and maximum residence time for dissolved hydrocarbon exposure to individual receptors, in the 0-10 m depth layer, for all seasonal conditions and all thresholds assessed. Outside of the receptors that the Bass 4 release location resides within, the maximum residence time of dissolved hydrocarbon exposure at the low threshold was predicted for Boags AMP (summer – 7 days, winter – 5 days).

Figure 11-10 and Figure 11-11 present the zones of potential dissolved hydrocarbon exposure for the 0-10 m depth layer, for each threshold assessed under summer and winter conditions, respectively.

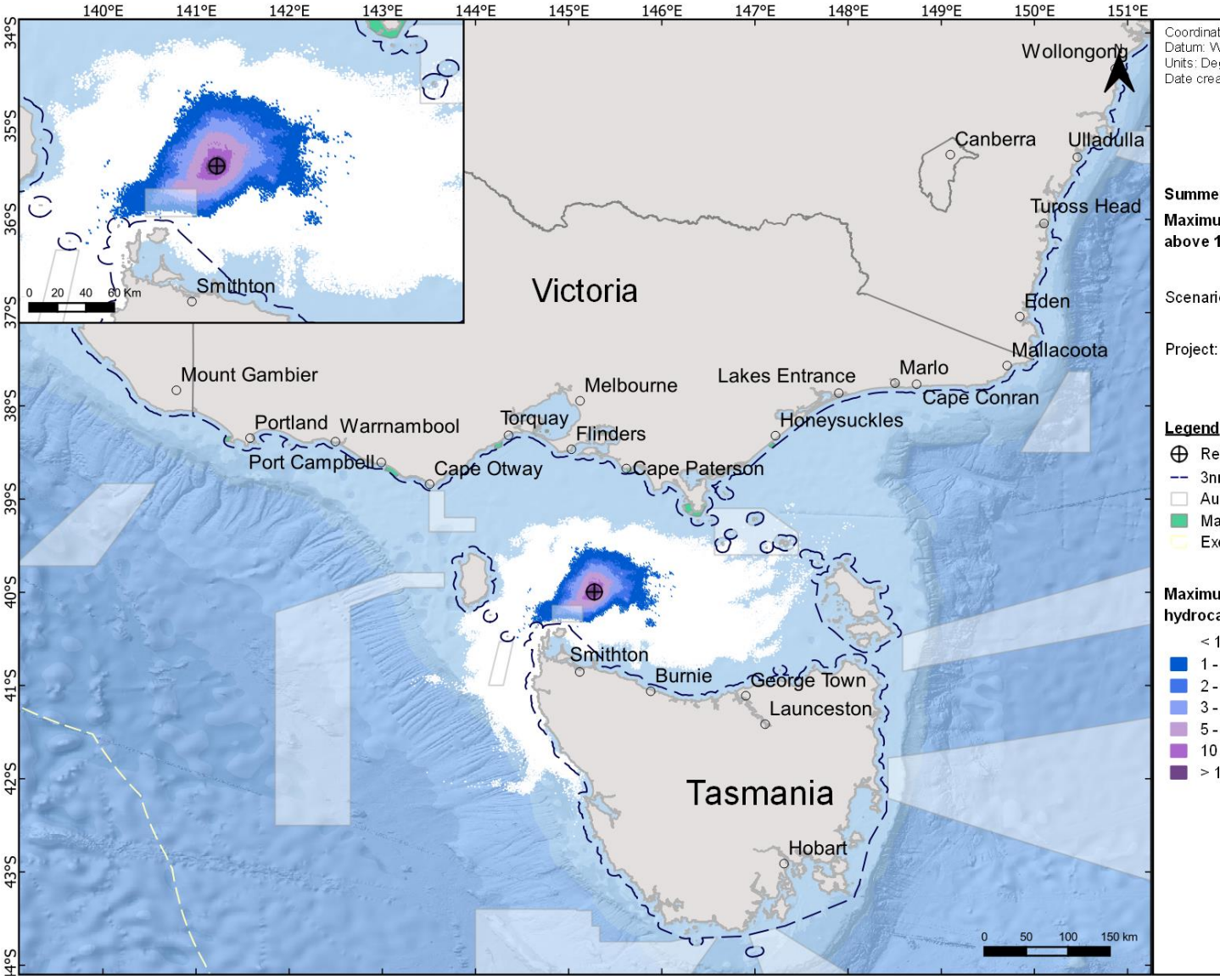

Figure 11-12 to Figure 11.17 presents the maximum residence time of dissolved hydrocarbon exposure for the NOPSEMA thresholds in summer and winter.

Table 11-6 Probability of dissolved hydrocarbons exposure to marine based receptors in the 0–10 m dept. Results are based on a 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March)				Winter (April to October)			
		Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure			Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure		
			Low	Moderate	High		Low	Moderate	High
AMP	Beagle	29	2	-	-	39	3	-	-
	Boags	1,392	100	100	12	1,157	100	89	7
	Franklin	921	44	14	1	149	10	2	-
BIA	Antipodean Albatross - Foraging	1,080	56	23	2	230	18	5	-
	Australasian Gannet - Foraging	1,194	86	45	2	847	52	18	1
	Black-browed Albatross - Foraging*	2,636	100	100	100	2,279	100	100	100
	Black-faced Cormorant - Foraging	678	64	23	2	249	25	8	-
	Bullers Albatross - Foraging*	2,636	100	100	100	2,279	100	100	100
	Campbell Albatross - Foraging*	2,636	100	100	100	2,279	100	100	100
	Common Diving-petrel - Foraging*	2,636	100	100	100	2,279	100	100	100
	Indian Yellow-nosed Albatross - Foraging*	2,636	100	100	100	2,279	100	100	100
	Little Penguin - Foraging	1,161	86	47	3	419	49	18	1
	Pygmy Blue Whale - Distribution*	2,636	100	100	100	2,279	100	100	100
	Pygmy Blue Whale - Foraging*	2,636	100	100	100	2,279	100	100	100
	Pygmy Blue Whale - Known Foraging Area	1,194	94	56	3	963	66	28	2
	Short-tailed Shearwater - Foraging*	2,636	100	100	100	2,279	100	100	100
	Shy Albatross - Breeding	613	63	25	1	201	31	9	-
	Shy Albatross - Foraging*	2,636	100	100	100	2,279	100	100	100
	Soft-plumaged Petrel - Foraging	125	7	1	-	115	3	1	-
	Southern Right Whale - Connecting Habitat	210	16	3	-	65	4	1	-
	Southern Right Whale - Known Core Range*	2,636	100	100	100	2,279	100	100	100
	Wandering Albatross - Foraging*	2,636	100	100	100	2,279	100	100	100
	White Shark - Distribution*	2,636	100	100	100	2,279	100	100	100
	White Shark - Foraging	881	64	24	1	559	31	9	1
	White-faced Storm-petrel - Foraging*	2,636	100	100	100	2,279	100	100	100

Receptor		Summer (November through to March)				Winter (April to October)			
		Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure			Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure		
			Low	Moderate	High		Low	Moderate	High
IBRA	Flinders	14	1	-	-	25	3	-	-
	King Island	613	74	29	1	225	31	9	-
	Tasmanian West	49	3	-	-	16	1	-	-
IMCRA	Boags	1,349	100	84	6	765	75	47	2
	Central Bass Strait*	2,636	100	100	100	2,279	100	100	100
	Flinders	31	3	-	-	112	8	1	-
	Franklin	791	34	9	2	230	10	4	-
	Otway	1,194	86	47	3	847	52	18	1
	Twofold Shelf	16	1	-	-	34	3	-	-
KEF	Upwelling East of Eden	2	-	-	-	16	1	-	-
	West Tasmania Canyons	117	8	3	-	34	1	-	-
NP	Kent Group	14	1	-	-	32	3	-	-
RSB	Bell Reef	20	3	-	-	6	-	-	-
	Brown Rocks	265	13	2	-	82	3	1	-
	Wakitipu Rock	4	-	-	-	16	1	-	-
	Warrego Rock	13	1	-	-	8	-	-	-
SHORE	Albatross Island	613	74	29	1	225	31	10	-
	Black Pyramid	170	31	5	-	170	7	2	-
	Circular Head	299	23	4	-	82	5	1	-
	Hunter Island	165	24	7	-	72	7	1	-
	Kent Island Group	9	-	-	-	25	3	-	-
	Pyramid Island	14	1	-	-	16	2	-	-
	Reid Rock	125	9	1	-	92	2	1	-
	Three Hummock Island	146	14	3	-	44	5	-	-
	West Coast	49	3	-	-	9	-	-	-
State Waters	Tasmania State Waters	1,161	84	38	2	394	42	15	-

*The release location resides within the receptor boundaries.

Table 11-7 Predicted minimum time to dissolved hydrocarbon exposure and maximum residence time for dissolved hydrocarbon exposure to individual receptors in the 0-10 m depth layer. Results are based on a 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill trajectories per season.

Receptor		Summer (November through to March)						Winter (April to October)					
		Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)			Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
AMP	Beagle	22	100	-	< 1	< 1	-	10	-	-	< 1	-	-
	Boags	1	1	2	7	3	< 1	1	1	2	5	2	< 1
	Franklin	5	9	11	1	< 1	< 1	17	24	-	1	< 1	-
BIA	Antipodean Albatross - Foraging	3	5	7	1	< 1	< 1	7	9	-	1	< 1	-
	Australasian Gannet - Foraging	3	3	7	1	1	< 1	3	3	7	1	< 1	< 1
	Black-browed Albatross - Foraging*	< 1	< 1	< 1	81	64	5	< 1	< 1	< 1	81	62	6
	Black-faced Cormorant - Foraging	3	5	10	1	< 1	< 1	7	9	-	1	< 1	-
	Bullers Albatross - Foraging*	< 1	< 1	< 1	81	64	5	< 1	< 1	< 1	81	62	6
	Campbell Albatross - Foraging*	< 1	< 1	< 1	81	64	5	< 1	< 1	< 1	81	62	6
	Common Diving-petrel - Foraging*	< 1	< 1	< 1	81	64	5	< 1	< 1	< 1	81	62	6
	Indian Yellow-nosed Albatross - Foraging*	< 1	< 1	< 1	81	64	5	< 1	< 1	< 1	81	62	6
	Little Penguin - Foraging	2	3	7	2	1	< 1	5	6	17	1	< 1	< 1
	Pygmy Blue Whale - Distribution*	< 1	< 1	< 1	81	64	5	< 1	< 1	< 1	81	62	6
	Pygmy Blue Whale - Foraging*	< 1	< 1	< 1	81	64	5	< 1	< 1	< 1	81	62	6
	Pygmy Blue Whale - Known Foraging Area	2	2	4	2	1	< 1	1	1	6	1	1	< 1
	Short-tailed Shearwater - Foraging*	< 1	< 1	< 1	81	64	5	< 1	< 1	< 1	81	62	6
	Shy Albatross - Breeding	3	5	12	1	< 1	< 1	5	8	-	1	< 1	-
	Shy Albatross - Foraging*	< 1	< 1	< 1	81	64	5	< 1	< 1	< 1	81	62	6
	Soft-plumaged Petrel - Foraging	12	13	-	< 1	< 1	-	51	60	-	< 1	< 1	-
	Southern Right Whale - Connecting Habitat	6	6	-	< 1	< 1	-	21	63	-	< 1	< 1	-
	Southern Right Whale - Known Core Range*	< 1	< 1	< 1	81	64	5	< 1	< 1	< 1	81	62	6
	Wandering Albatross - Foraging*	< 1	< 1	< 1	81	64	5	< 1	< 1	< 1	81	62	6
	White Shark - Distribution*	< 1	< 1	< 1	81	64	5	< 1	< 1	< 1	81	62	6

Receptor		Summer (November through to March)						Winter (April to October)					
		Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)			Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
	White Shark - Foraging	3	3	7	1	1	< 1	3	4	7	1	< 1	< 1
	White-faced Storm-petrel - Foraging*	< 1	< 1	< 1	81	64	5	< 1	< 1	< 1	81	62	6
IBRA	Flinders	57	-	-	< 1	-	-	11	11	-	< 1	< 1	-
	King Island	3	5	12	1	< 1	< 1	5	8	-	1	< 1	-
	Tasmanian West	32	-	-	< 1	-	-	52	-	-	< 1	-	-
IMCRA	Boags	2	2	2	2	1	< 1	2	2	5	2	1	< 1
	Central Bass Strait*	< 1	< 1	< 1	81	64	5	< 1	< 1	< 1	81	62	6
	Flinders	22	100	-	< 1	< 1	-	8	8	-	< 1	< 1	-
	Franklin	6	7	7	1	< 1	< 1	14	24	-	1	< 1	-
	Otway	2	3	7	2	1	< 1	2	2	7	1	< 1	< 1
	Twofold Shelf	57	-	-	< 1	-	-	10	11	-	< 1	< 1	-
KEF	Upwelling East of Eden	-	-	-	-	-	-	43	-	-	< 1	-	-
	West Tasmania Canyons	11	19	-	< 1	< 1	-	61	-	-	< 1	-	-
NP	Kent Group	57	-	-	< 1	-	-	10	11	-	< 1	< 1	-
RSB	Bell Reef	12	-	-	< 1	-	-	65	-	-	< 1	-	-
	Brown Rocks	8	9	-	< 1	< 1	-	12	64	-	< 1	< 1	-
	Wakitipu Rock	-	-	-	-	-	-	38	-	-	< 1	-	-
	Warrego Rock	58	-	-	< 1	-	-	45	-	-	< 1	-	-
SHORE	Albatross Island	3	5	12	1	< 1	< 1	5	7	-	1	< 1	-
	Black Pyramid	9	9	-	1	< 1	-	17	60	-	< 1	< 1	-
	Circular Head	6	8	-	< 1	< 1	-	12	63	-	< 1	< 1	-
	Hunter Island	6	7	-	1	< 1	-	7	12	-	1	< 1	-
	Kent Island Group	57	-	-	< 1	-	-	11	11	-	< 1	< 1	-
	Pyramid Island	67	-	-	< 1	-	-	13	-	-	< 1	-	-
	Reid Rock	10	14	-	< 1	< 1	-	61	62	-	< 1	< 1	-
	Three Hummock Island	4	16	-	< 1	< 1	-	12	-	-	< 1	-	-
	West Coast	32	-	-	< 1	-	-	65	-	-	< 1	-	-

Receptor		Summer (November through to March)						Winter (April to October)					
		Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)			Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
State Waters	Tasmania State Waters	2	3	10	1	1	< 1	5	6	17	1	< 1	< 1

*The release location resides within the receptor boundaries.

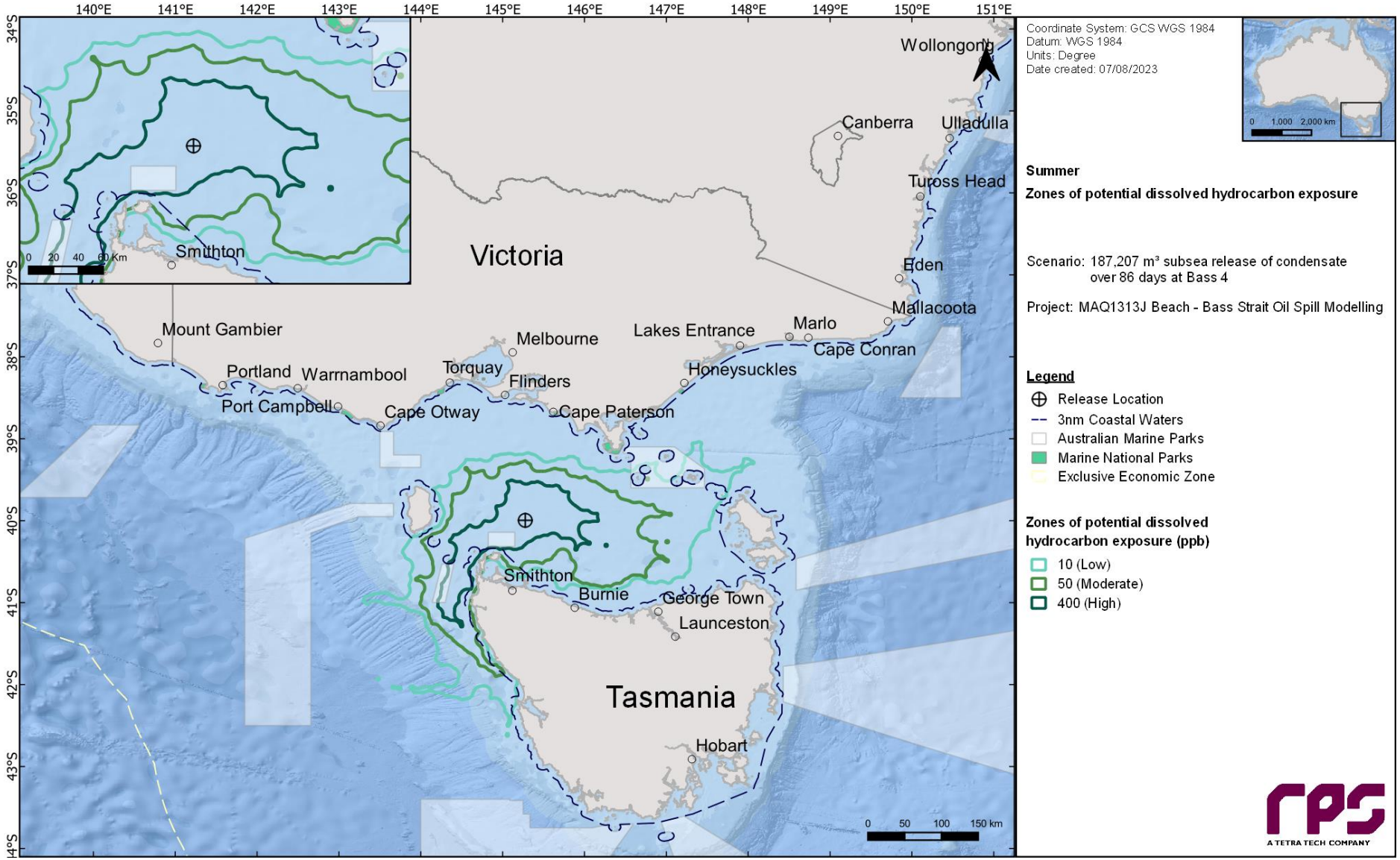

Figure 11-10 Zones of potential dissolved hydrocarbon exposure at 0-10 m below the sea in the event of a 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations during summer conditions.

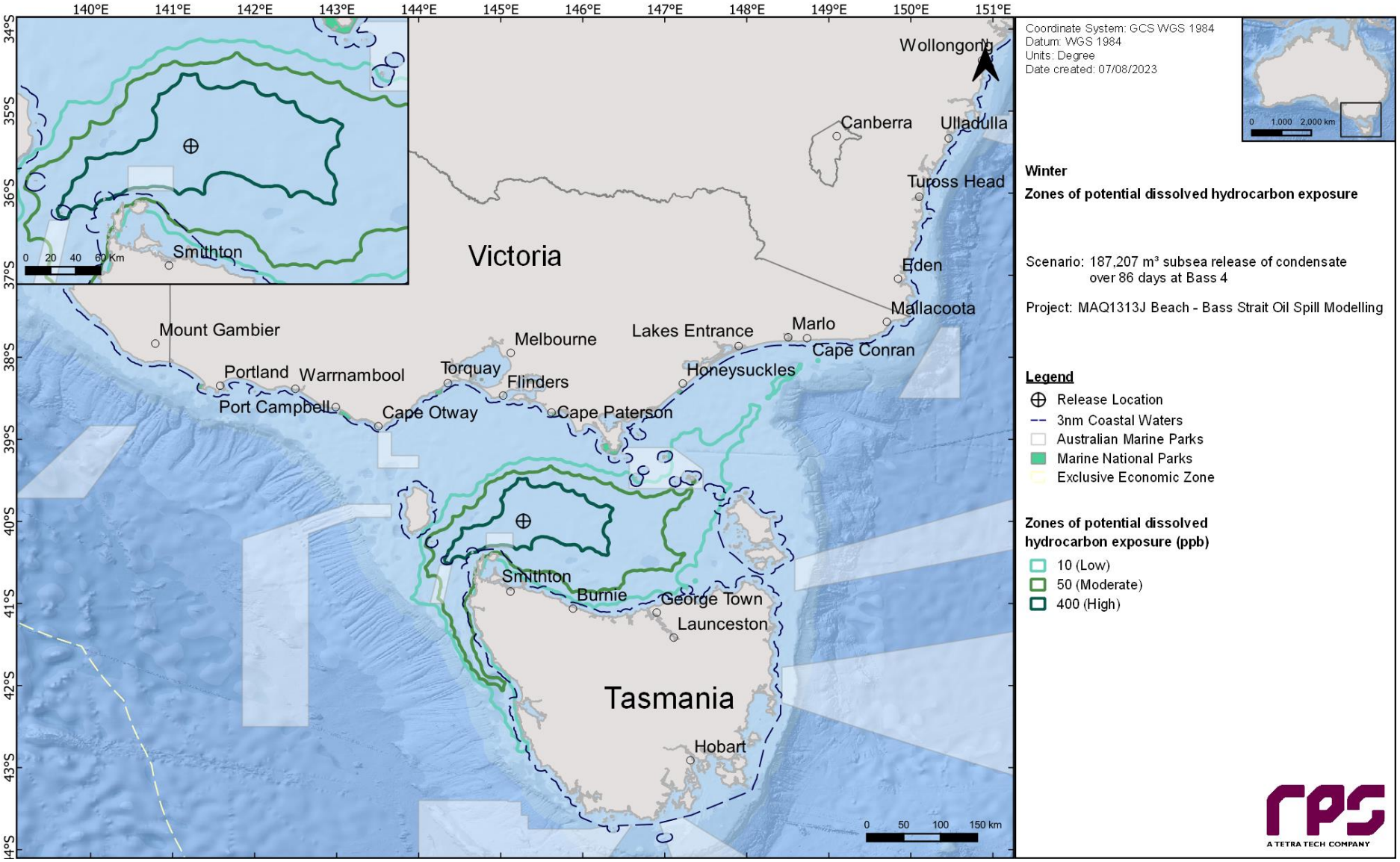

Figure 11-11 Zones of potential dissolved hydrocarbon exposure at 0-10 m below the sea in the event of a 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations during winter conditions.

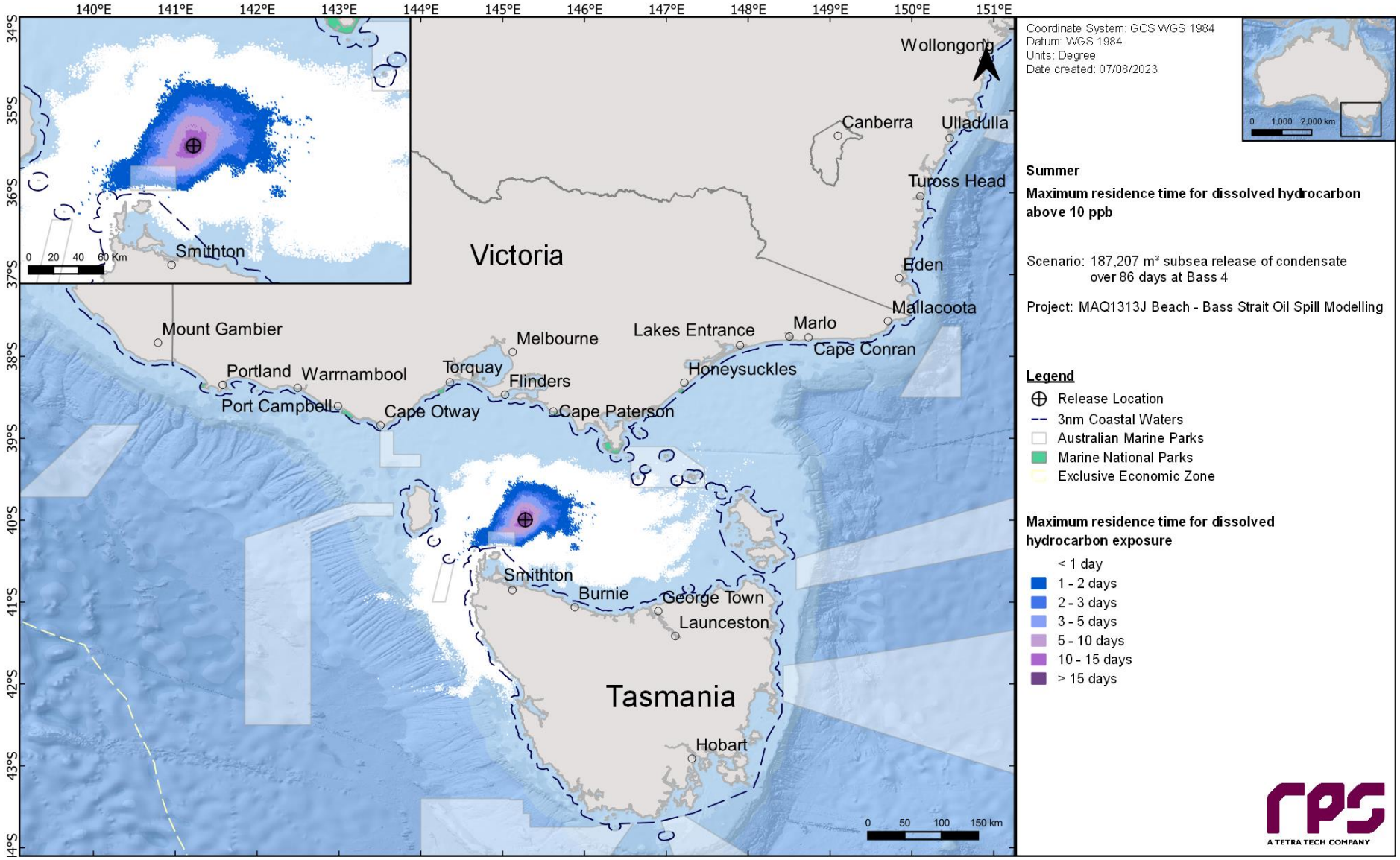

Figure 11-12 Maximum residence time for dissolved hydrocarbon exposure above 10 ppb, at 0-10 m below the sea surface in the event of a 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations during summer conditions.

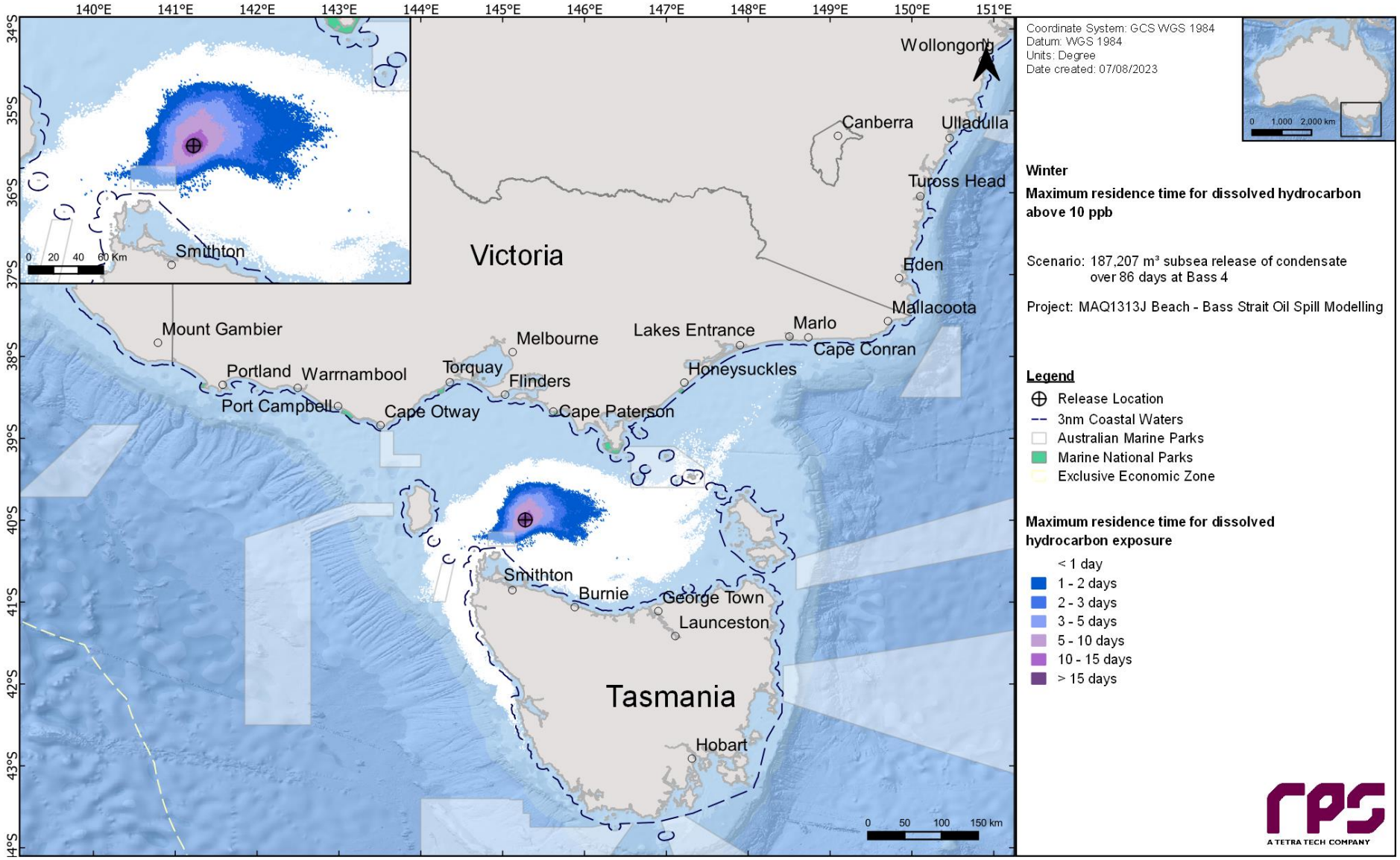

Figure 11.13 Maximum residence time for dissolved hydrocarbon exposure above 10 ppb, at 0-10 m below the sea surface in the event of a 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations during winter conditions.

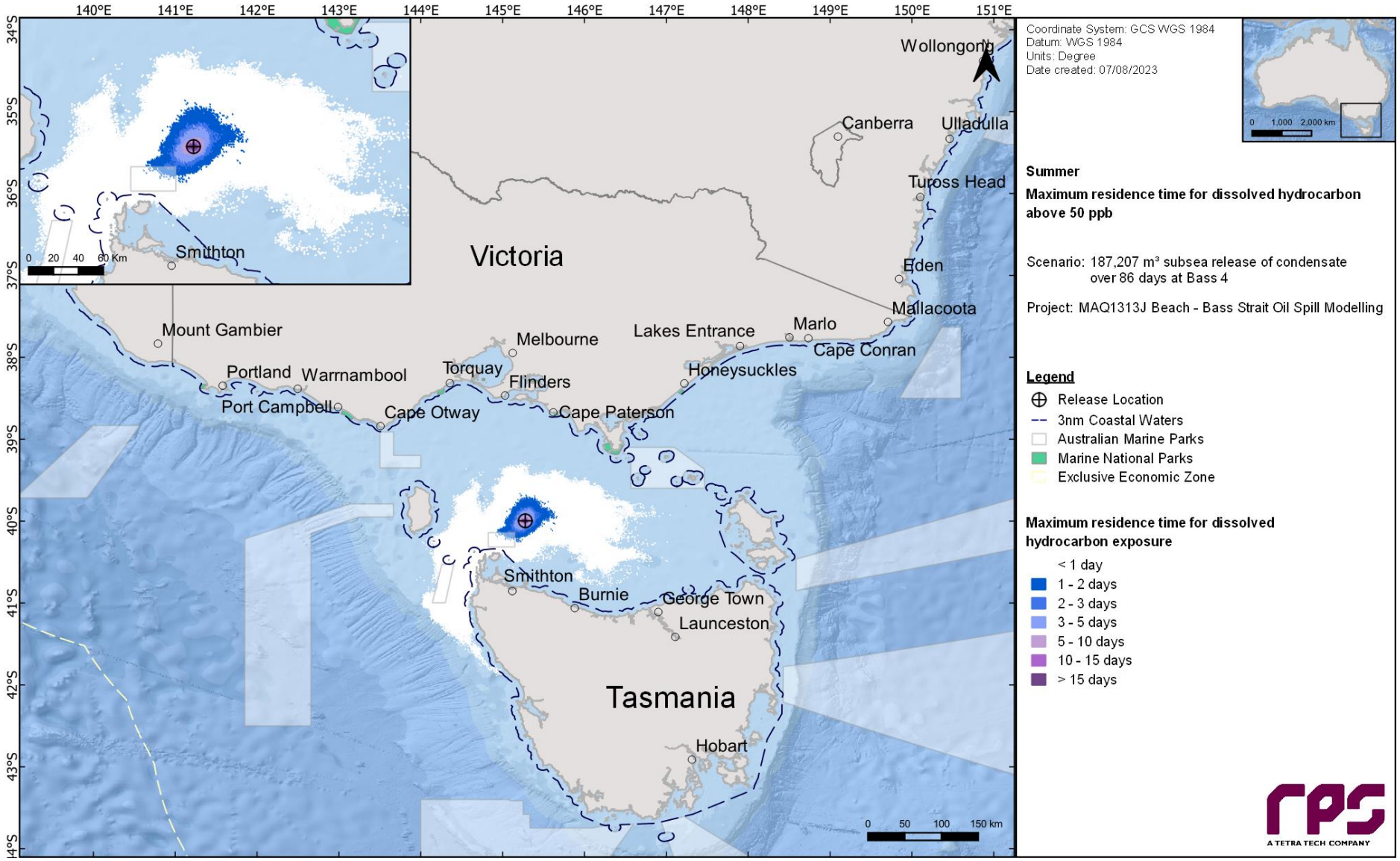

Figure 11.14 Maximum residence time for dissolved hydrocarbon exposure above 50 ppb, at 0-10 m below the sea surface in the event of a 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations during summer conditions.

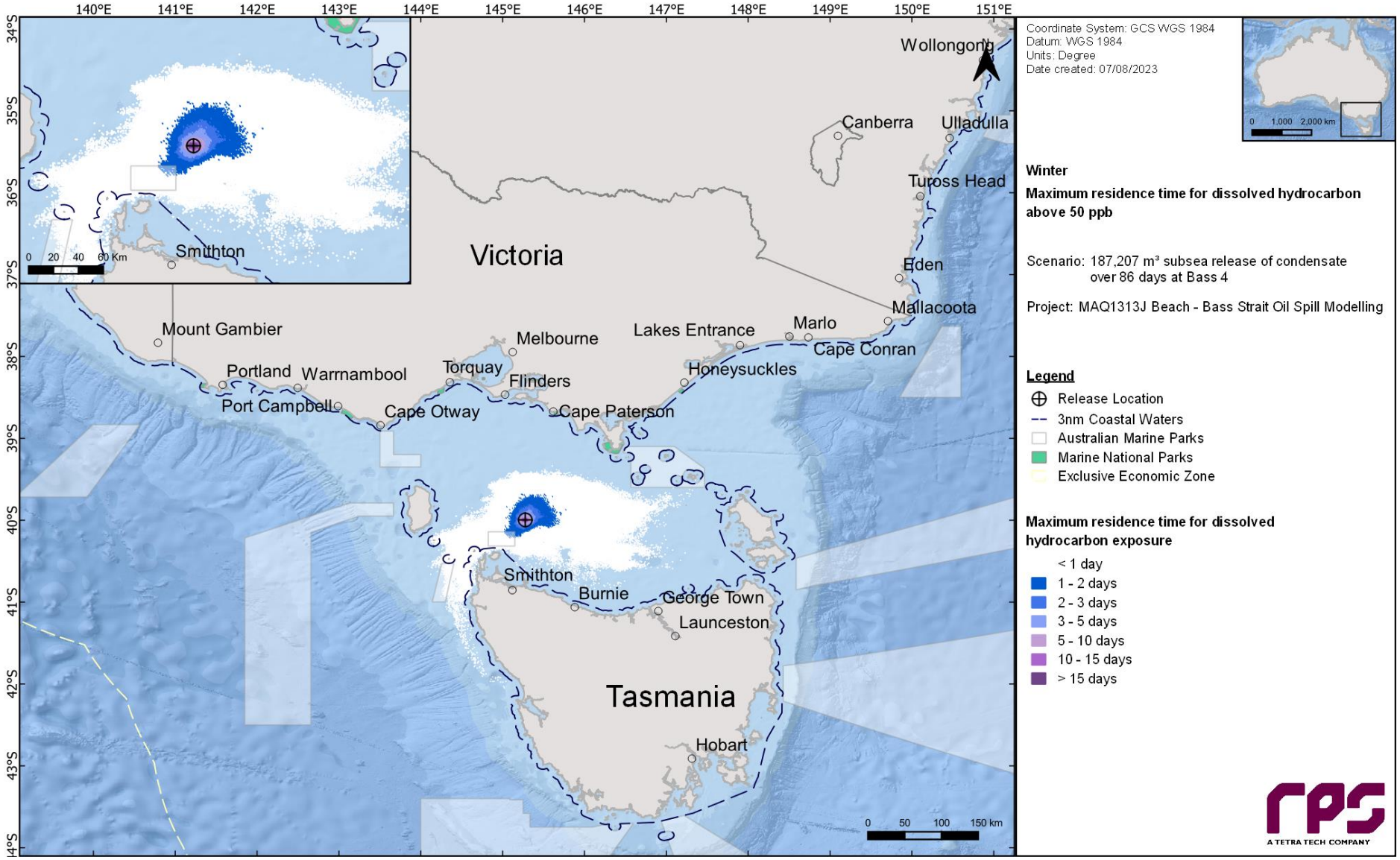

Figure 11.15 Maximum residence time for dissolved hydrocarbon exposure above 50 ppb, at 0-10 m below the sea surface in the event of a 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations during winter conditions.

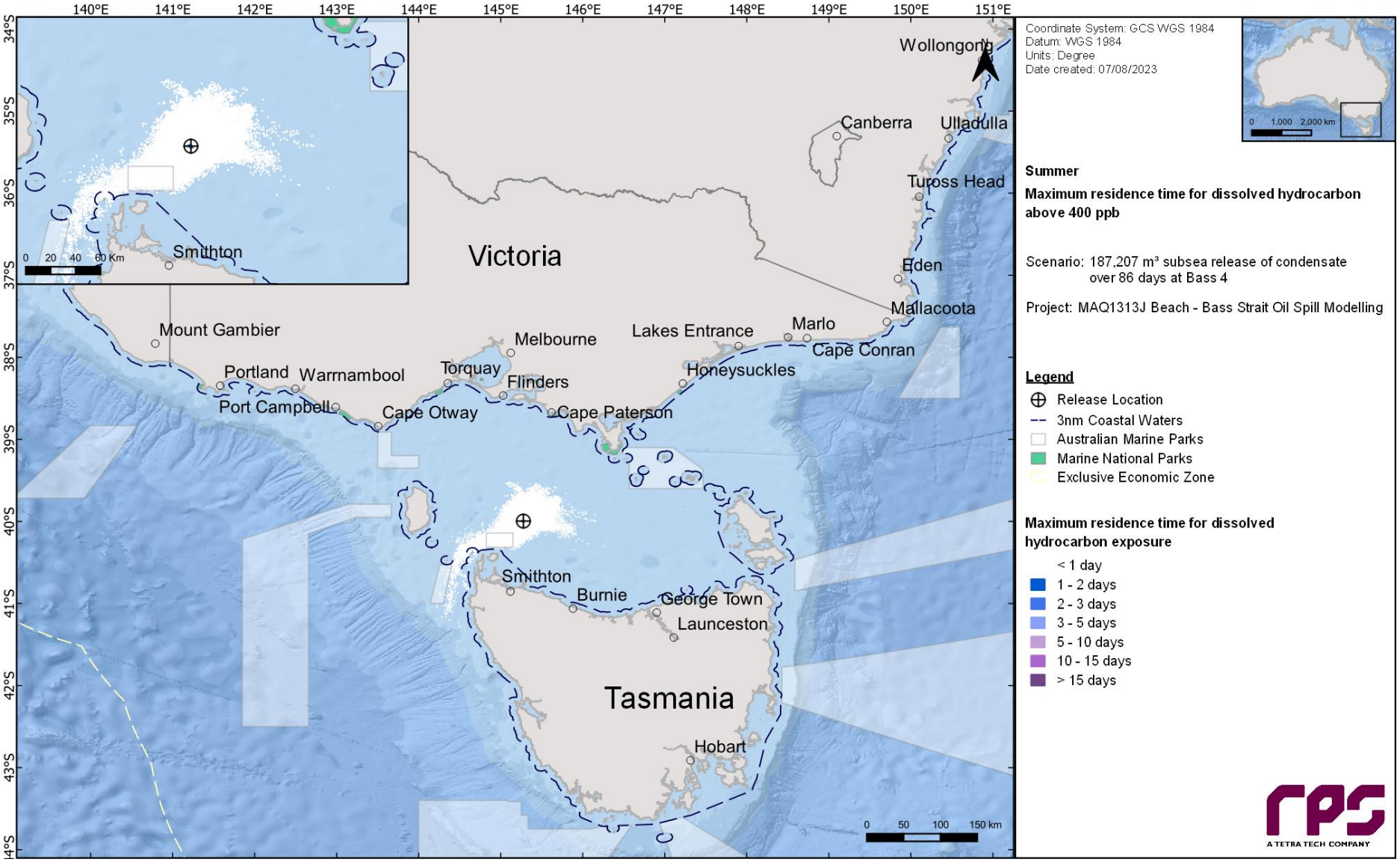

Figure 11.16 Maximum residence time for dissolved hydrocarbon exposure above 400 ppb, at 0-10 m below the sea surface in the event of a 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations during summer conditions.

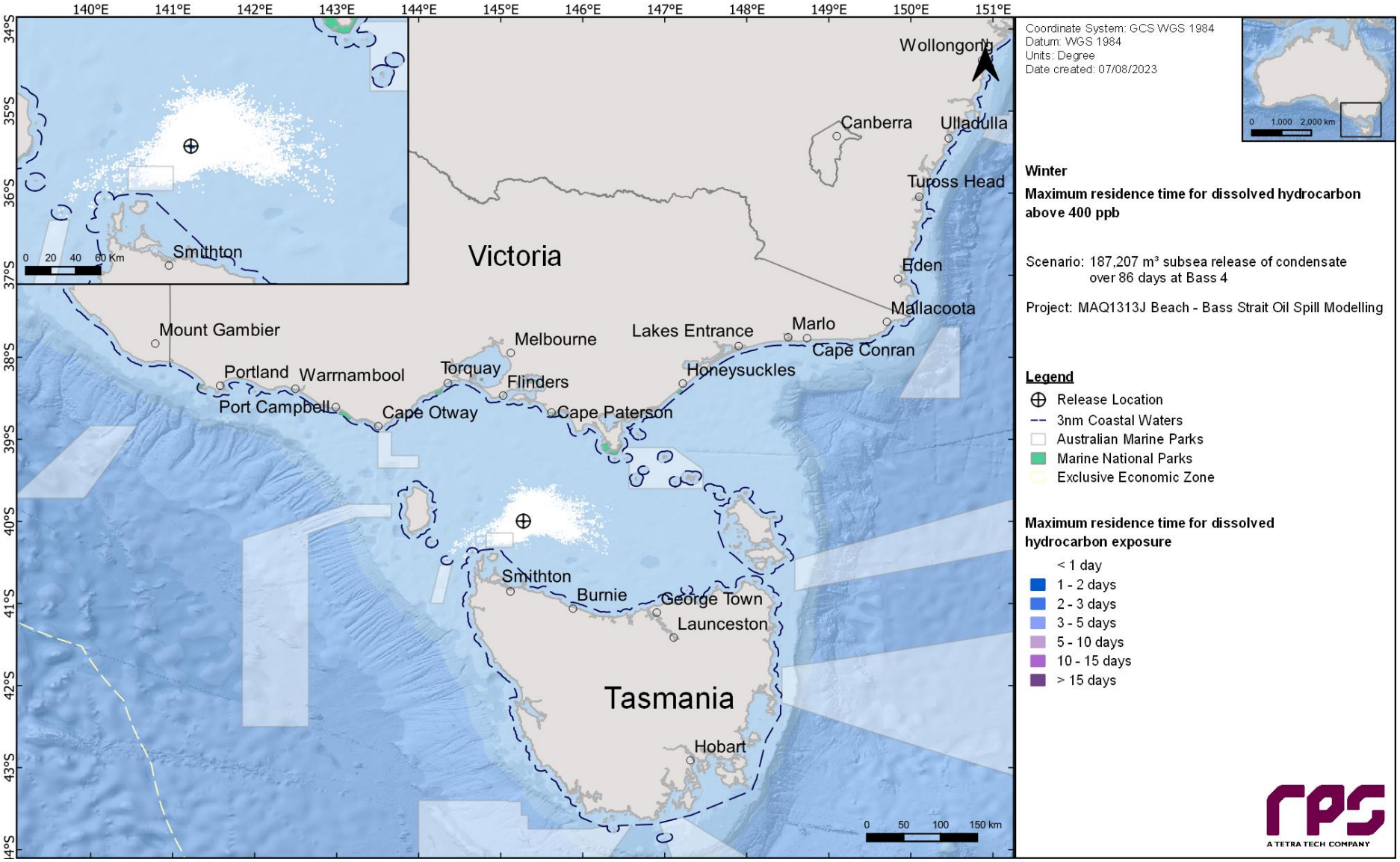

Figure 11.17 Maximum residence time for dissolved hydrocarbon exposure above 400 ppb, at 0-10 m below the sea surface in the event of a 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations during winter conditions.

11.4.2 Entrained Hydrocarbons

Table 11-8 presents the probability of exposure to individual receptors from entrained hydrocarbons in the 0-10 m depth layer for the summer and winter conditions.

Outside of the receptors that the Bass 4 release location resides within (refer to Table 10-2), the highest concentration of entrained hydrocarbon was predicted for Boags AMP (summer –,1,758 ppb, winter – 1,360 ppb). The same receptor, along with Pygmy Blue Whale - Known Foraging Area BIA also presented the highest probabilities of low entrained hydrocarbon exposure (100% in both seasons).

Table 11-9 presents the predicted minimum time to entrained hydrocarbon exposure and maximum residence time for entrained hydrocarbon exposure to individual receptors in the 0-10 m depth layer, for all seasonal conditions and all thresholds assessed.

Figure 11-18 and Figure 11-19 presents the zones of potential entrained hydrocarbon exposure for the 0-10 m depth layer, for each threshold assessed under summer and winter conditions, respectively.

Figure 11-20 to Figure 11-23 presents the maximum residence time of entrained hydrocarbon exposure for the NOPSEMA thresholds in summer and winter.

Table 11-8 Probability of entrained hydrocarbons exposure to marine based receptors in the 0–10 m depth layer. Results are based on a 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March)			Winter (April to October)		
		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure	
			Low	High		Low	High
AMP	Beagle	300	42	1	394	74	1
	Boags	1,758	100	100	1,360	100	100
	East Gippsland	8	-	-	17	1	-
	Flinders	5	-	-	12	4	-
	Franklin	657	88	54	433	43	12
	Tasman Fracture	15	6	-	14	1	-
	Zeehan	12	1	-	5	-	-
BIA	Antipodean Albatross - Foraging	769	96	65	1,124	59	23
	Australasian Gannet - Foraging	922	97	92	1,124	74	51
	Black Petrel - Foraging	7	-	-	18	7	-
	Black-browed Albatross - Foraging	22,471	100	100	25,575	100	100
	Black-faced Cormorant - Foraging	493	96	75	705	62	34
	Bullers Albatross - Foraging	22,471	100	100	25,575	100	100
	Campbell Albatross - Foraging	22,471	100	100	25,575	100	100
	Common Diving-petrel - Foraging	22,471	100	100	25,575	100	100
	Crested Tern - Breeding	5	-	-	21	8	-
	Crested Tern - Foraging	6	-	-	18	7	-
	Flesh-footed Shearwater - Foraging	7	-	-	18	7	-
	Grey Nurse Shark - Foraging	7	-	-	21	8	-
	Grey Nurse Shark - Migration	8	-	-	23	10	-
	Humpback Whale - Foraging	11	1	-	26	10	-
	Indian Yellow-nosed Albatross - Foraging	22,471	100	100	25,575	100	100
	Indo-Pacific/Spotted Bottlenose Dolphin - Breeding	6	-	-	23	8	-
	Little Penguin - Breeding	6	-	-	21	8	-

Receptor		Summer (November through to March)			Winter (April to October)		
		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure	
			Low	High		Low	High
	Little Penguin - Foraging	827	100	92	732	86	49
	Pygmy Blue Whale - Distribution	22,471	100	100	25,575	100	100
	Pygmy Blue Whale - Foraging	22,471	100	100	25,575	100	100
	Pygmy Blue Whale - Foraging annual high use area	6	-	-	11	1	-
	Pygmy Blue Whale - Known Foraging Area	1,257	100	96	1,131	100	66
	Short-tailed Shearwater - Breeding	73	50	-	35	11	-
	Short-tailed Shearwater - Foraging	22,471	100	100	25,575	100	100
	Shy Albatross - Breeding	827	96	73	662	63	26
	Shy Albatross - Foraging	22,471	100	100	25,575	100	100
	Soft-plumaged Petrel - Foraging	466	67	2	286	18	2
	Sooty Shearwater - Foraging	36	12	-	32	10	-
	Southern Right Whale - Connecting Habitat	220	84	9	565	36	3
	Southern Right Whale - Known Core Range	22,471	100	100	25,575	100	100
	Wandering Albatross - Foraging	22,471	100	100	25,575	100	100
	Wedge-tailed Shearwater - Foraging	20	9	-	30	10	-
	White Shark - Breeding	9	-	-	218	2	1
	White Shark - Distribution	22,471	100	100	25,575	100	100
	White Shark - Foraging	904	96	78	561	80	26
	White-faced Storm-petrel - Breeding	7	-	-	21	8	-
	White-faced Storm-petrel - Foraging	22,471	100	100	25,575	100	100
	White-fronted Tern - Foraging	9	-	-	20	15	-
CA	Arthur Bay	6	-	-	19	9	-
	Marriott Reef	7	-	-	16	11	-
IBRA	Bateman	5	-	-	21	8	-
	East Gippsland Lowlands	7	-	-	19	3	-
	Flinders	135	43	1	236	74	2
	King Island	827	96	75	662	65	28

Receptor		Summer (November through to March)			Winter (April to October)		
		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure	
			Low	High		Low	High
	Tasmanian South East	4	-	-	11	1	-
	Tasmanian West	88	53	-	81	9	-
	Wilsons Promontory	17	1	-	12	1	-
IMCRA	Batemans Shelf	7	-	-	21	8	-
	Boags	1,206	100	100	960	99	78
	Central Bass Strait	22,471	100	100	25,575	100	100
	Davey	28	11	-	22	3	-
	Flinders	360	52	1	488	83	2
	Franklin	769	87	36	1,121	39	12
	Otway	929	100	92	1,124	75	52
	Twofold Shelf	190	42	1	357	74	2
KEF	Big Horseshoe Canyon	7	-	-	15	7	-
	Shelf rocky reefs	6	-	-	15	6	-
	Upwelling East of Eden	15	5	-	30	29	-
	West Tasmania Canyons	206	55	13	251	19	1
MNP	Cape Howe	8	-	-	25	5	-
	Point Hicks	6	-	-	12	3	-
MP	Batemans	5	-	-	21	8	-
NP	Kent Group	109	42	1	258	74	2
RSB	Bell Reef	79	44	-	73	15	-
	Brown Rocks	167	86	10	357	34	2
	Cutter Rock	27	1	-	17	5	-
	Endeavour Reef	51	19	-	53	64	-
	New Zealand Star Bank	8	-	-	20	13	-
	Wakitipu Rock	99	29	-	43	68	-
	Warrego Rock	40	19	-	53	66	-
	Wright Rock	49	20	-	188	66	1
SHORE	Albatross Island	827	96	77	662	65	28

Receptor	Summer (November through to March)			Winter (April to October)		
	Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure	
		Low	High		Low	High
Badger Island	9	-	-	18	20	-
Bega Valley	6	-	-	18	3	-
Big green Island	6	-	-	20	7	-
Black Pyramid	490	79	36	176	38	7
Boxen Island	8	-	-	15	10	-
Cape Barren Osland	7	-	-	13	3	-
Chalky Island	9	-	-	24	17	-
Circular Head	225	87	11	461	39	6
Clarke Island	4	-	-	11	2	-
Craggy Island	80	18	-	99	61	-
Curtis Island	78	19	-	41	36	-
De Witt Island	18	8	-	17	1	-
East Gippsland	7	-	-	18	3	-
East Kangaroo Island	8	-	-	21	9	-
Eurobodalla	3	-	-	13	5	-
Flinders Island	15	4	-	26	20	-
Gabo Island	8	-	-	19	2	-
Goose Island	8	-	-	16	18	-
Hogan Island Group	68	9	-	31	23	-
Hunter Island	300	94	39	367	55	18
Huon Valley	23	10	-	17	1	-
Inner Sister Island	21	4	-	32	23	-
Kent Island Group	109	42	1	236	74	2
King Island	23	18	-	26	10	-
Maatsuyker Island	21	10	-	22	1	-
Mewstone	11	1	-	10	-	-
Moncoeur Islands	17	1	-	12	1	-
Montague Island	5	-	-	21	8	-

Receptor		Summer (November through to March)			Winter (April to October)		
		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure	
			Low	High		Low	High
	Mount Chappell Island	7	-	-	16	10	-
	Ninth Island	4	-	-	13	1	-
	Outer Sister Island	23	5	-	34	22	-
	Pasco Group	13	2	-	24	21	-
	Preservation Island	4	-	-	10	1	-
	Prime Seal Island	11	1	-	32	23	-
	Pyramid Island	135	43	1	168	71	2
	Reef Island	9	-	-	23	13	-
	Reid Rock	147	56	6	132	16	3
	Robbins Island	23	16	-	27	6	-
	Rodondo Island	12	1	-	9	-	-
	Round Top Island	16	8	-	15	1	-
	Three Hummock Island	178	92	15	446	51	9
	West Coast	88	53	-	81	7	-
State Waters	New South Wales	6	-	-	23	8	-
	Tasmania State Waters	827	100	91	809	74	41
	Victoria State Waters	25	2	-	25	5	-
SUB-LGA	Bega Valley	6	-	-	18	3	-
	Cape Howe / Mallacoota	7	-	-	18	2	-
	Croajingolong - West	6	-	-	11	1	-
	Eurobodalla	3	-	-	13	5	-
	Point Hicks	6	-	-	11	3	-

*The release location resides within the receptor boundaries.

Table 11-9 Predicted minimum time to entrained hydrocarbon exposure and maximum residence time for entrained hydrocarbon exposure to individual receptors in the 0-10 m depth layer. Results are based on a 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill trajectories per season.

Receptor		Summer (November through to March)				Winter (April to October)			
		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)	
		Low	High	Low	High	Low	High	Low	High
AMP	Beagle	15	97	19	< 1	8	90	35	< 1
	Boags	1	1	84	51	1	1	69	27
	East Gippsland	-	-	-	-	98	-	1	-
	Flinders	-	-	-	-	52	-	< 1	-
	Franklin	5	6	61	6	10	13	40	1
	Tasman Fracture	68	-	2	-	82	-	2	-
	Zeehan	34	-	< 1	-	-	-	-	-
BIA	Antipodean Albatross - Foraging	3	3	66	8	5	7	40	5
	Australasian Gannet - Foraging	2	2	70	9	2	5	51	8
	Black Petrel - Foraging	-	-	-	-	44	-	2	-
	Black-browed Albatross - Foraging*	< 1	0	98	83	< 1	< 1	98	83
	Black-faced Cormorant - Foraging	3	3	64	9	5	7	36	7
	Bullers Albatross - Foraging*	< 1	< 1	98	83	< 1	< 1	98	83
	Campbell Albatross - Foraging*	< 1	< 1	98	83	< 1	< 1	98	83
	Common Diving-petrel - Foraging*	< 1	< 1	98	83	< 1	< 1	98	83
	Crested Tern - Breeding	-	-	-	-	44	-	2	-
	Crested Tern - Foraging	-	-	-	-	44	-	2	-
	Flesh-footed Shearwater - Foraging	-	-	-	-	44	-	2	-
	Grey Nurse Shark - Foraging	-	-	-	-	41	-	2	-
	Grey Nurse Shark - Migration	-	-	-	-	40	-	2	-
	Humpback Whale - Foraging	92	-	< 1	-	40	-	2	-
	Indian Yellow-nosed Albatross - Foraging*	< 1	< 1	98	83	< 1	< 1	98	83
	Indo-Pacific/Spotted Bottlenose Dolphin - Breeding	-	-	-	-	41	-	2	-
	Little Penguin - Breeding	-	-	-	-	44	-	2	-

Receptor		Summer (November through to March)				Winter (April to October)			
		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)	
		Low	High	Low	High	Low	High	Low	High
	Little Penguin - Foraging	2	2	69	9	3	4	41	8
	Pygmy Blue Whale - Distribution*	< 1	< 1	98	83	< 1	< 1	98	83
	Pygmy Blue Whale - Foraging*	< 1	< 1	98	83	< 1	< 1	98	83
	Pygmy Blue Whale - Foraging annual high use area	-	-	-	-	93	-	< 1	-
	Pygmy Blue Whale - Known Foraging Area	2	2	79	11	1	1	71	8
	Short-tailed Shearwater - Breeding	20	-	57	-	60	-	25	-
	Short-tailed Shearwater - Foraging*	< 1	< 1	98	83	< 1	< 1	98	83
	Shy Albatross - Breeding	2	3	59	5	4	5	32	6
	Shy Albatross - Foraging*	< 1	< 1	98	83	< 1	< 1	98	83
	Soft-plumaged Petrel - Foraging	8	16	66	2	15	48	35	< 1
	Sooty Shearwater - Foraging	35	-	30	-	40	-	20	-
	Southern Right Whale - Connecting Habitat	4	8	66	1	8	63	35	< 1
	Southern Right Whale - Known Core Range*	< 1	< 1	98	83	< 1	< 1	98	83
	Wandering Albatross - Foraging*	< 1	< 1	98	83	< 1	< 1	98	83
	Wedge-tailed Shearwater - Foraging	31	-	2	-	29	-	3	-
	White Shark - Breeding	-	-	-	-	23	99	< 1	< 1
	White Shark - Distribution*	< 1	< 1	98	83	< 1	< 1	98	83
	White Shark - Foraging	3	3	63	4	3	7	47	5
	White-faced Storm-petrel - Breeding	-	-	-	-	41	-	2	-
	White-faced Storm-petrel - Foraging*	< 1	< 1	98	83	< 1	< 1	98	83
	White-fronted Tern - Foraging	-	-	-	-	23	-	11	-
CA	Arthur Bay	-	-	-	-	66	-	13	-
	Marriott Reef	-	-	-	-	60	-	3	-
IBRA	Bateman	-	-	-	-	44	-	2	-
	East Gippsland Lowlands	-	-	-	-	47	-	2	-
	Flinders	22	57	18	< 1	8	10	37	1
	King Island	2	3	59	9	4	5	35	7

Receptor		Summer (November through to March)				Winter (April to October)			
		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)	
		Low	High	Low	High	Low	High	Low	High
	Tasmanian South East	-	-	-	-	28	-	< 1	-
	Tasmanian West	13	-	66	-	42	-	34	-
	Wilsons Promontory	92	-	1	-	26	-	< 1	-
IMCRA	Batemans Shelf	-	-	-	-	42	-	2	-
	Boags	1	1	73	22	2	2	54	14
	Central Bass Strait*	< 1	< 1	98	83	< 1	< 1	98	83
	Davey	39	-	30	-	71	-	13	-
	Flinders	15	95	26	< 1	5	10	45	< 1
	Franklin	4	6	66	3	8	9	37	3
	Otway	2	2	71	9	2	4	53	8
	Twofold Shelf	32	57	18	< 1	9	10	37	1
KEF	Big Horseshoe Canyon	-	-	-	-	39	-	< 1	-
	Shelf rocky reefs	-	-	-	-	45	-	1	-
	Upwelling East of Eden	63	-	< 1	-	20	-	6	-
	West Tasmania Canyons	7	11	37	1	17	98	29	< 1
MNP	Cape Howe	-	-	-	-	41	-	2	-
	Point Hicks	-	-	-	-	48	-	< 1	-
MP	Batemans	-	-	-	-	44	-	2	-
NP	Kent Group	32	57	19	< 1	9	10	37	1
RSB	Bell Reef	10	-	24	-	23	-	10	-
	Brown Rocks	4	9	43	3	8	20	28	< 1
	Cutter Rock	92	-	5	-	18	-	2	-
	Endeavour Reef	46	-	16	-	9	-	35	-
	New Zealand Star Bank	-	-	-	-	28	-	4	-
	Wakitipu Rock	40	-	16	-	9	97	25	< 1
	Warrego Rock	41	-	13	-	16	-	28	-
	Wright Rock	42	-	16	-	9	97	32	< 1
SHORE	Albatross Island	2	3	59	6	4	5	33	7

Receptor	Summer (November through to March)				Winter (April to October)			
	Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)	
	Low	High	Low	High	Low	High	Low	High
Badger Island	-	-	-	-	23	-	4	-
Bega Valley	-	-	-	-	80	-	2	-
Big green Island	-	-	-	-	67	-	13	-
Black Pyramid	5	9	55	3	8	15	35	1
Boxen Island	-	-	-	-	26	-	3	-
Cape Barren Osland	-	-	-	-	36	-	1	-
Chalky Island	-	-	-	-	32	-	17	-
Circular Head	3	8	53	7	7	13	33	1
Clarke Island	-	-	-	-	33	-	< 1	-
Craggy Island	41	-	13	-	20	-	35	-
Curtis Island	22	-	8	-	12	-	6	-
De Witt Island	63	-	4	-	79	-	7	-
East Gippsland	-	-	-	-	47	-	2	-
East Kangaroo Island	-	-	-	-	47	-	13	-
Eurobodalla	-	-	-	-	45	-	1	-
Flinders Island	62	-	1	-	24	-	18	-
Gabo Island	-	-	-	-	95	-	2	-
Goose Island	-	-	-	-	23	-	2	-
Hogan Island Group	46	-	6	-	13	-	2	-
Hunter Island	3	4	58	9	6	7	35	7
Huon Valley	49	-	27	-	77	-	7	-
Inner Sister Island	60	-	3	-	26	-	17	-
Kent Island Group	32	57	18	< 1	9	10	37	1
King Island	13	-	3	-	27	-	4	-
Maatsuyker Island	62	-	8	-	78	-	11	-
Mewstone	85	-	< 1	-	-	-	-	-
Moncoeur Islands	92	-	1	-	26	-	< 1	-
Montague Island	-	-	-	-	44	-	2	-

Receptor		Summer (November through to March)				Winter (April to October)			
		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)	
		Low	High	Low	High	Low	High	Low	High
	Mount Chappell Island	-	-	-	-	26	-	5	-
	Ninth Island	-	-	-	-	28	-	< 1	-
	Outer Sister Island	60	-	2	-	24	-	11	-
	Pasco Group	63	-	< 1	-	24	-	17	-
	Preservation Island	-	-	-	-	64	-	< 1	-
	Prime Seal Island	90	-	< 1	-	25	-	20	-
	Pyramid Island	31	98	12	< 1	8	96	24	< 1
	Reef Island	-	-	-	-	45	-	16	-
	Reid Rock	8	12	32	1	22	63	18	< 1
	Robbins Island	21	-	12	-	11	-	6	-
	Rodondo Island	92	-	< 1	-	27	-	< 1	-
	Round Top Island	65	-	3	-	80	-	6	-
	Three Hummock Island	3	6	46	2	6	8	29	2
	West Coast	13	-	66	-	51	-	34	-
State Waters	New South Wales	-	-	-	-	41	-	2	-
	Tasmania State Waters	2	2	66	9	3	5	37	8
	Victoria State Waters	64	-	2	-	25	-	3	-
SUB-LGA	Bega Valley	-	-	-	-	80	-	2	-
	Cape Howe / Mallacoota	-	-	-	-	88	-	2	-
	Croajingolong - West	-	-	-	-	56	-	< 1	-
	Eurobodalla	-	-	-	-	45	-	1	-
	Point Hicks	-	-	-	-	48	-	< 1	-

*The release location resides within the receptor boundaries.

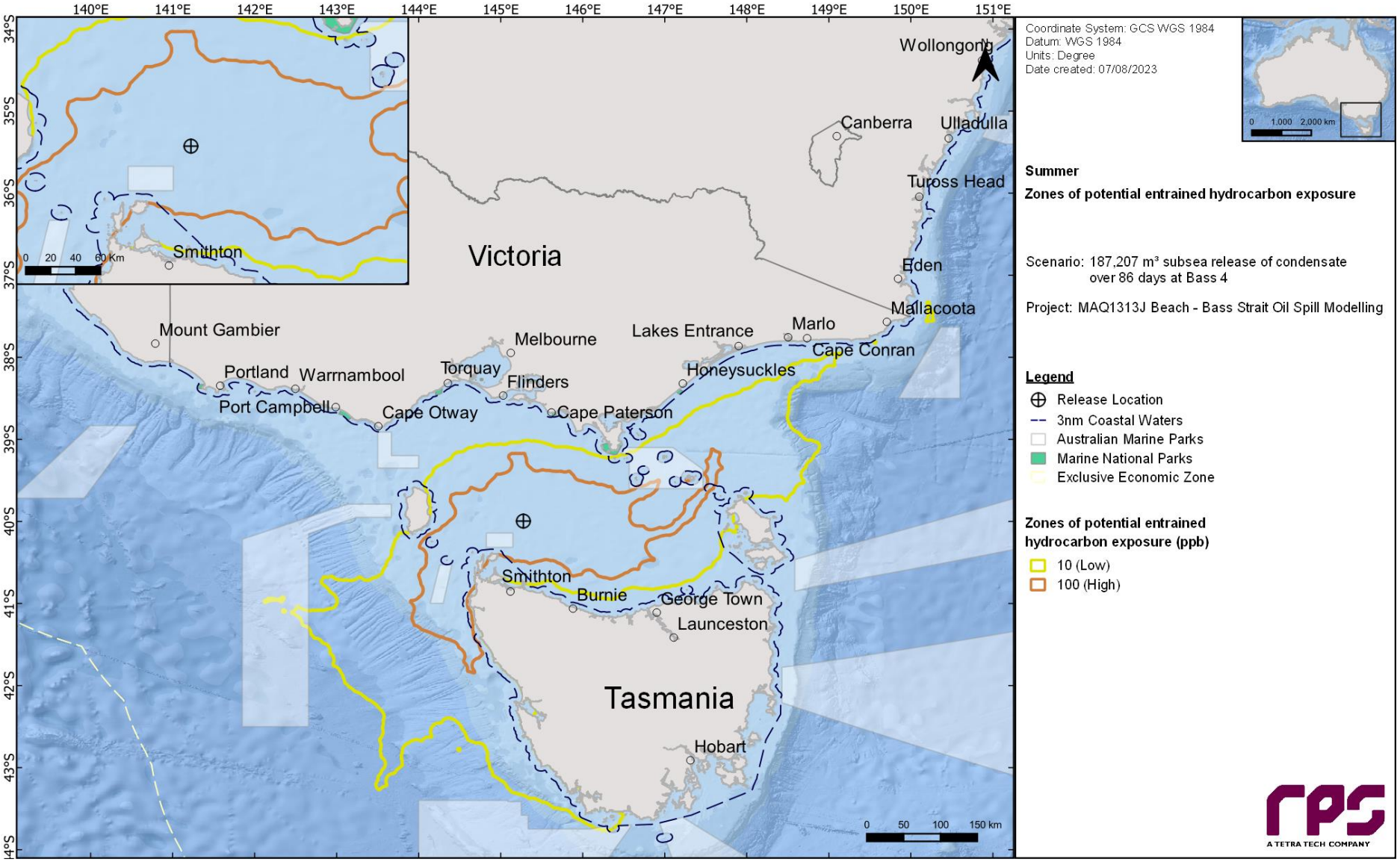

Figure 11-18 Zones of potential entrained hydrocarbon exposure at 0-10 m below the sea surface in the event of a 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations during summer conditions.

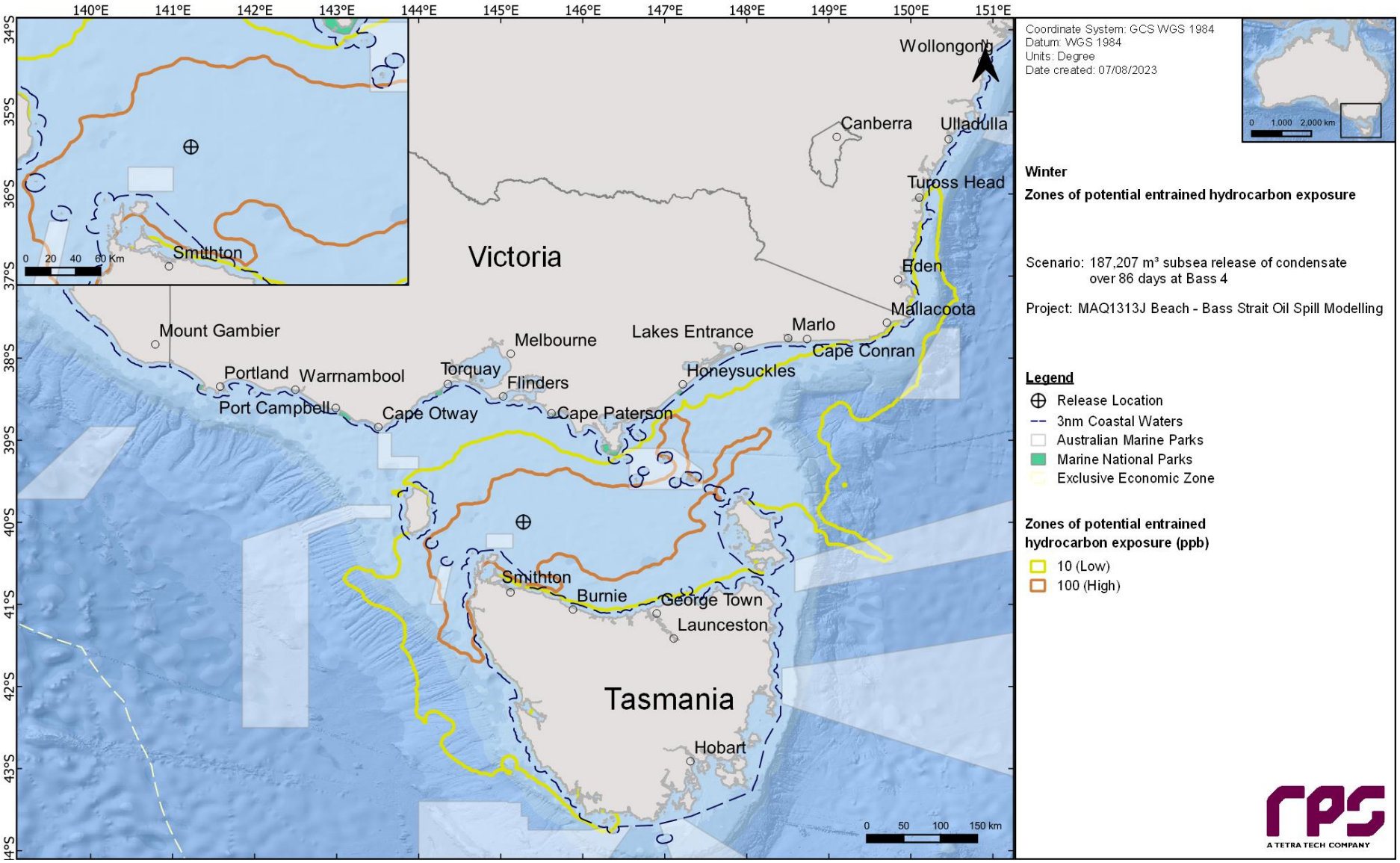

Figure 11-19 Zones of potential entrained hydrocarbon exposure at 0-10 m below the sea surface in the event of a 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations during winter conditions.

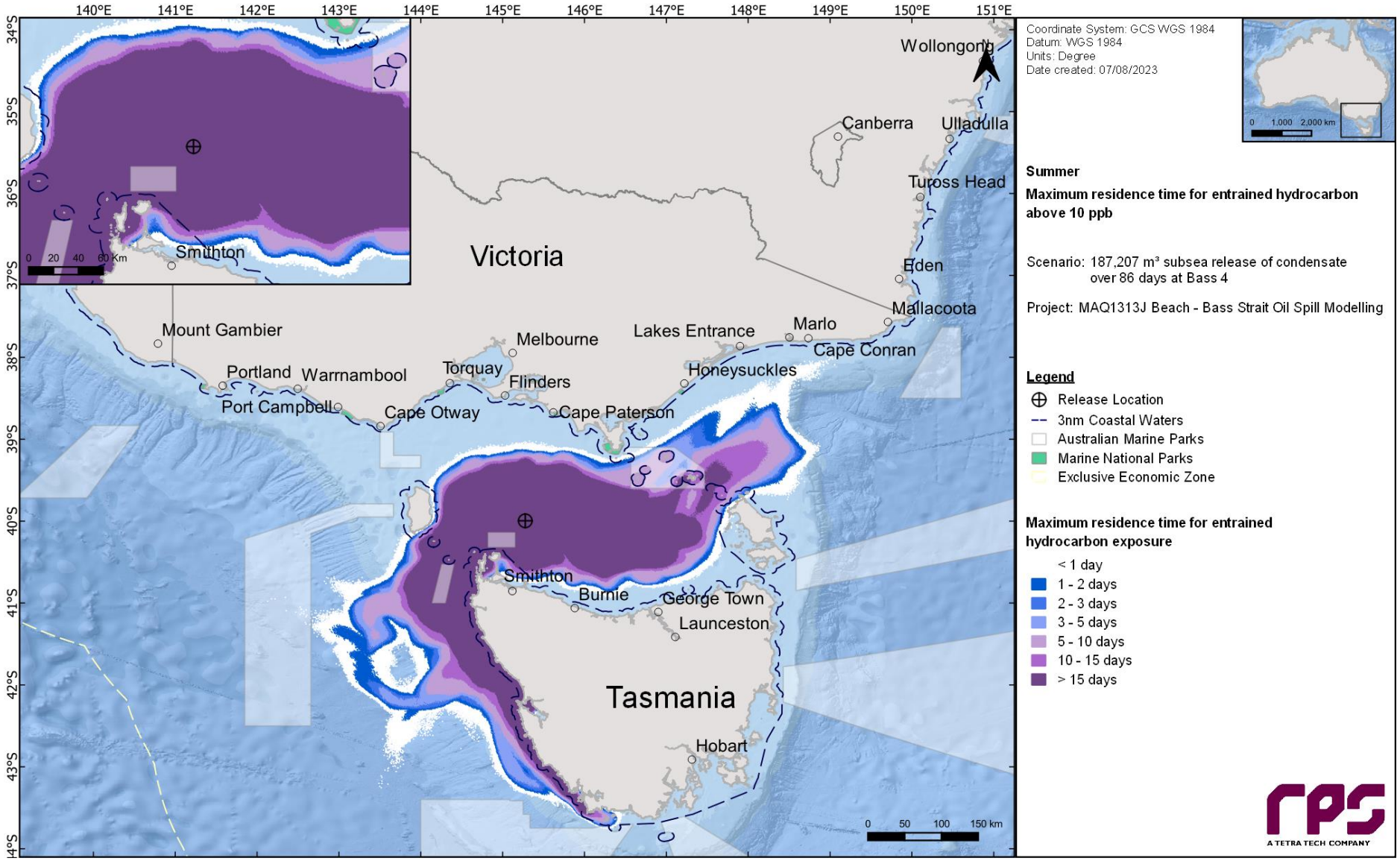

Figure 11-20 Maximum residence time for entrained hydrocarbon exposure above 10 ppb, at 0-10 m below the sea surface in the event of a 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations during summer conditions.

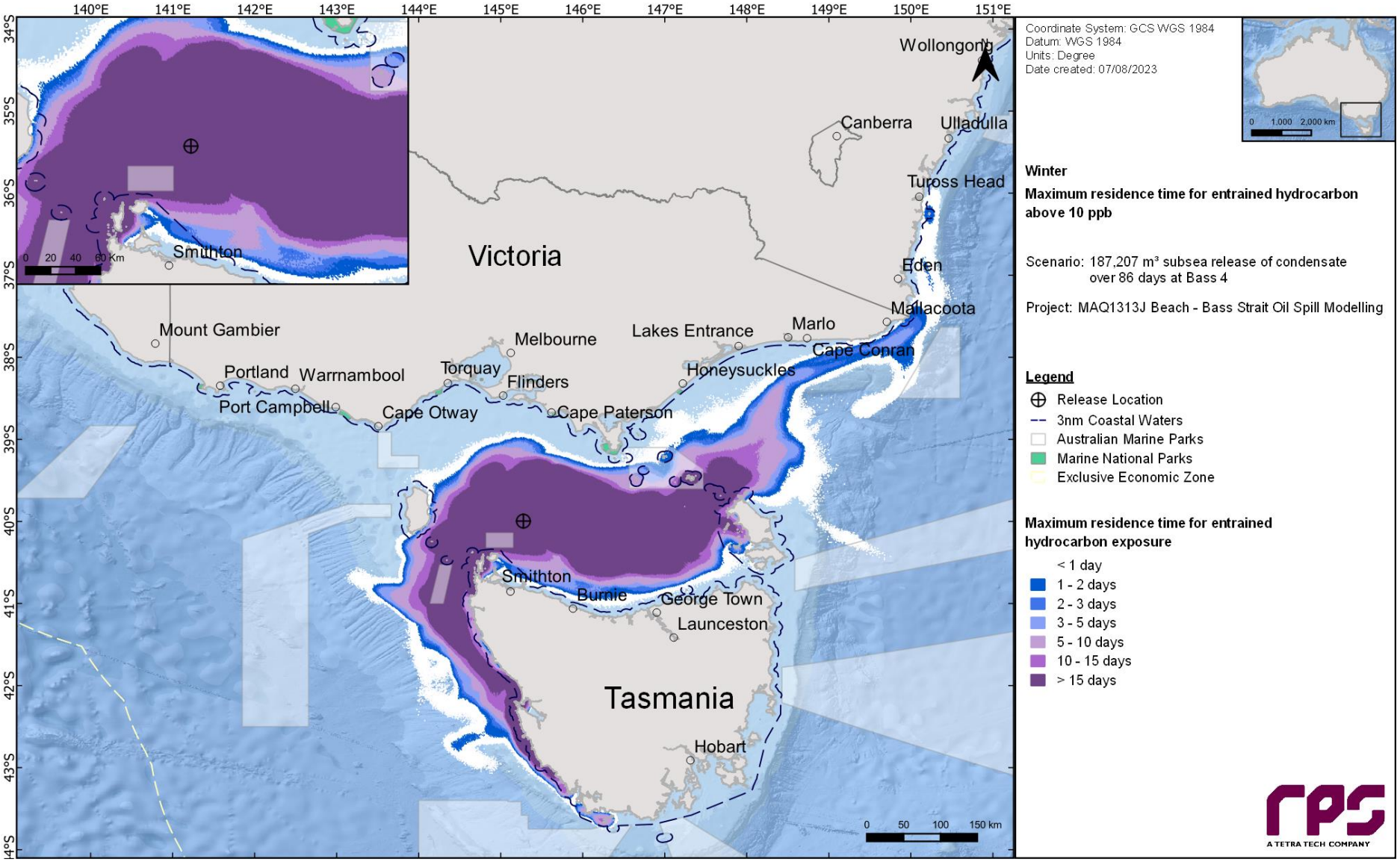

Figure 11-21 Maximum residence time for entrained hydrocarbon exposure above 10 ppb, at 0-10 m below the sea surface in the event of a 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations during winter conditions.

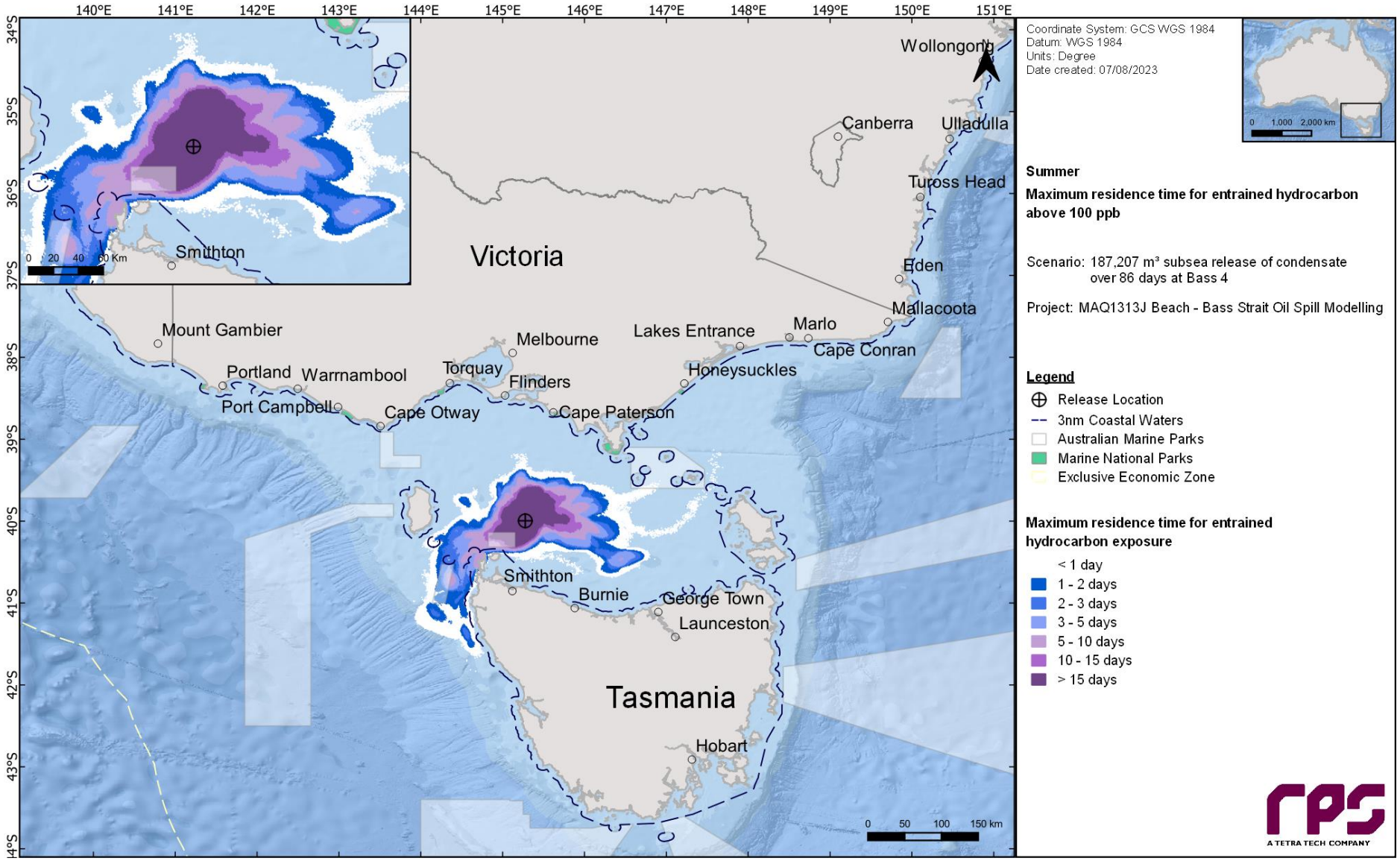

Figure 11-22 Maximum residence time for entrained hydrocarbon exposure above 100 ppb, at 0-10 m below the sea surface in the event of a 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations during summer conditions.

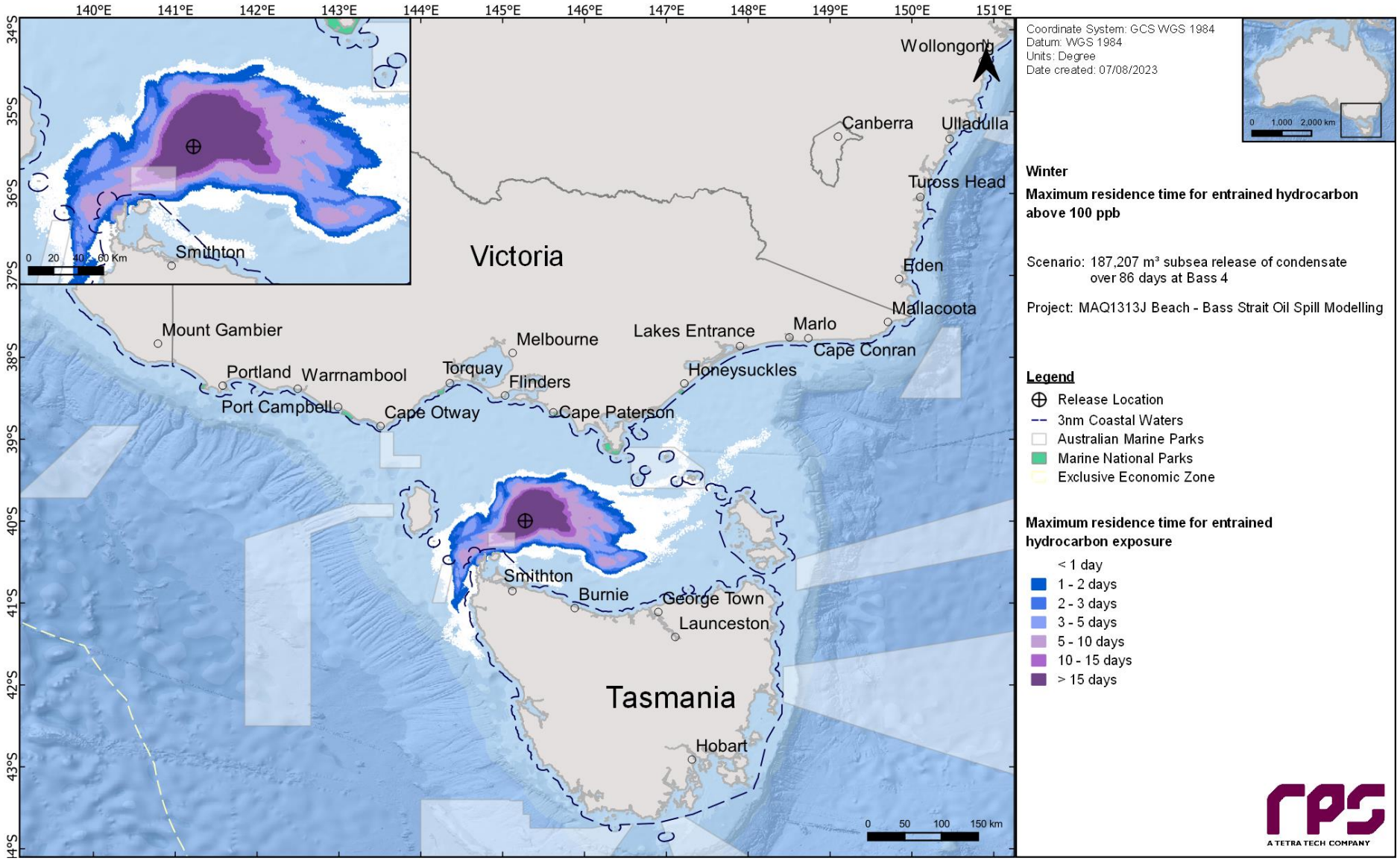

Figure 11-23 Maximum residence time for entrained hydrocarbon exposure above 100 ppb, at 0-10 m below the sea surface in the event of a 187,207 m³ subsea release of condensate over 86 days from a loss of well control at the Bass 4 location. The results were calculated from 100 spill simulations during winter conditions.

12 RESULTS – LOSS OF CONTAINMENT FROM VESSEL COLLISION AT BASS 4

This scenario examined a 603.7 m^3 surface release of marine diesel from a loss of containment from a vessel collision at the Bass 4 location. A total of 200 spill simulations were run (i.e., 100 spills per season) and tracked for 30 days. The results for all 100 simulations per season were combined and are presented on a seasonal basis (i.e., summer and winter).

12.1 Area of Exposure

Figure 12-1 presents the combined area of potential exposure for surface, shoreline, entrained and dissolved, by overlaying the results from all 200 simulations (i.e., 100 per season) during summer and winter conditions.

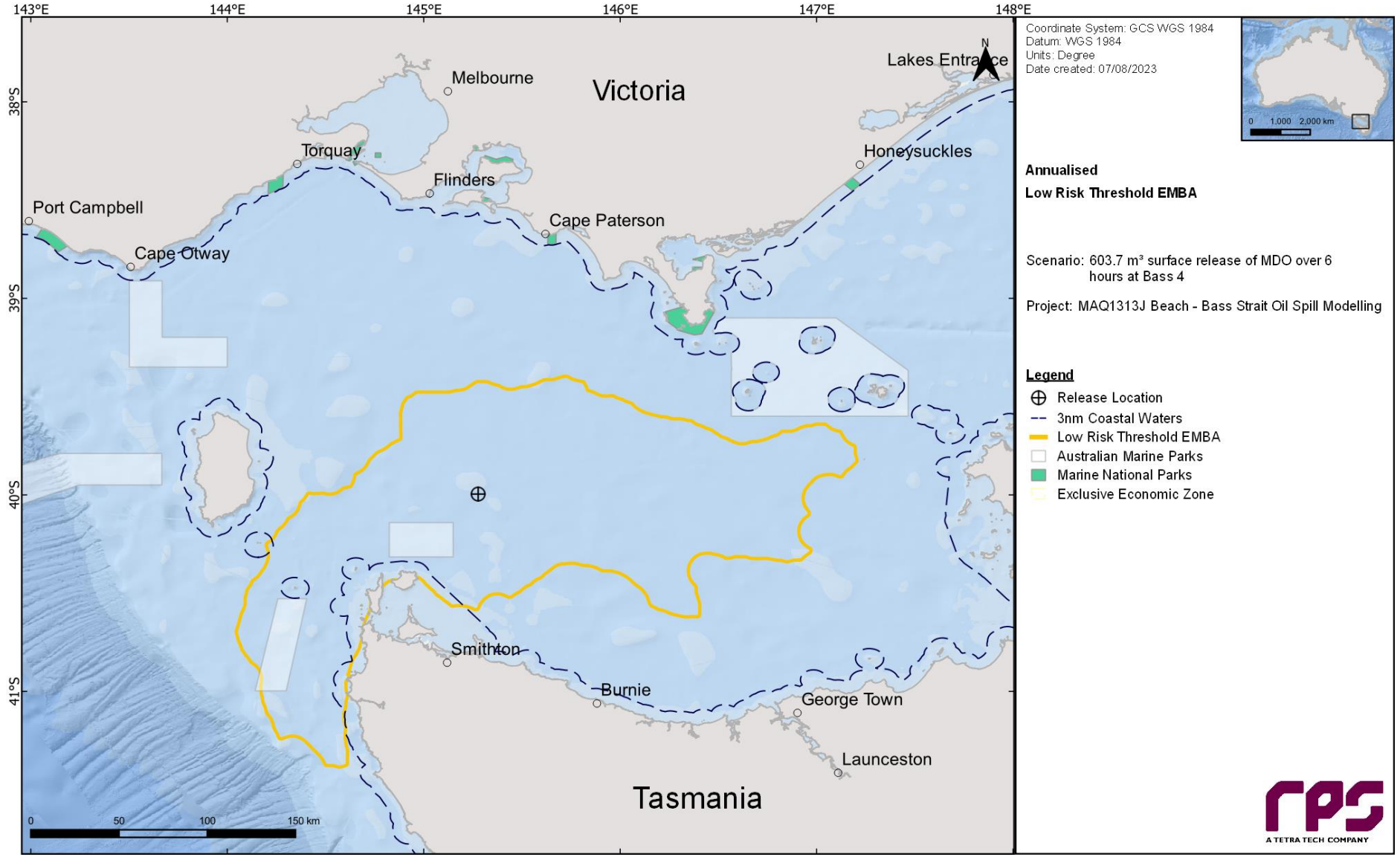

Figure 12-1 **Predicted area of exposure for low thresholds produced by overlaying the results from all 200 simulations, resulting from a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location during summer and winter conditions.**

12.2 Floating Oil Exposure

Table 12-1 summarises the maximum distance travelled by floating oil on the sea surface at each threshold. The maximum distance from the release location to the low (1–10 g/m^2), moderate (10–50 g/m^2) and high (> 50g/ m^2) exposure zones was 42 km (west-southwest) during winter conditions, and 25 km (west-southwest) during summer conditions and 11 km (west) during winter conditions respectively.

Table 12-2 summarises the potential floating oil exposure to individual receptors during the summer and winter conditions. Outside of the receptors that the Bass 4 release location resides within (refer to Table 10-2), floating oil exposure above the low threshold was predicted at the Boags AMP (1% summer and 2% winter) and the Pygmy Blue Whale - Known Foraging Area BIA (1% winter).

Table 12-3 presents the maximum residence time of floating oil exposure for each individual grid cell within each individual receptor during summer and winter.

Figure 12-2 and Figure 12-3 present the zones of potential floating oil exposure for all thresholds under summer and winter conditions, respectively.

Figure 12-4 to Figure 12-9 present the maximum residence time of floating oil exposure for the NOPSEMA thresholds during summer and winter, respectively.

Table 12-1 Maximum distance and direction from the release location to the edge of floating oil exposure. Results are based on a 603.7 m^3 surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations per season.

Season	Distance and direction travelled	Zones of potential floating oil exposure		
		Low	Moderate	High
Summer	Maximum distance (km) from release location	27	25	11
	Maximum distance (km) from release location (99th percentile)	25	23	11
	Direction	SW	WSW	W
Winter	Maximum distance (km) from release location	42	21	10
	Maximum distance (km) from release location (99th percentile)	36	20	10
	Direction	WSW	NNW	SSW

Table 12-2 Summary of the potential floating oil exposure to individual receptors. Results are based on a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March)						Winter (April to October)					
		Probability of floating oil exposure (%)			Minimum time before floating oil exposure (hours)			Probability of floating oil exposure (%)			Minimum time before floating oil exposure (hours)		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
AMP	Boags	1	-	-	36	-	-	2	-	-	41	-	-
BIA	Black-browed Albatross - Foraging*	100	100	59	1	1	1	100	100	57	1	1	1
	Bullers Albatross - Foraging*	100	100	59	1	1	1	100	100	57	1	1	1
	Campbell Albatross - Foraging*	100	100	59	1	1	1	100	100	57	1	1	1
	Common Diving-petrel - Foraging*	100	100	59	1	1	1	100	100	57	1	1	1
	Indian Yellow-nosed Albatross - Foraging*	100	100	59	1	1	1	100	100	57	1	1	1
	Pygmy Blue Whale - Distribution*	100	100	59	1	1	1	100	100	57	1	1	1
	Pygmy Blue Whale - Foraging*	100	100	59	1	1	1	100	100	57	1	1	1
	Pygmy Blue Whale - Known Foraging Area	-	-	-	-	-	-	1	-	-	31	-	-
	Short-tailed Shearwater - Foraging*	100	100	59	1	1	1	100	100	57	1	1	1
	Shy Albatross - Foraging*	100	100	59	1	1	1	100	100	57	1	1	1
	Southern Right Whale - Known Core Range*	100	100	59	1	1	1	100	100	57	1	1	1
	Wandering Albatross - Foraging*	100	100	59	1	1	1	100	100	57	1	1	1
	White Shark - Distribution*	100	100	59	1	1	1	100	100	57	1	1	1
	White-faced Storm-petrel - Foraging*	100	100	59	1	1	1	100	100	57	1	1	1
IMCRA	Central Bass Strait*	100	100	59	1	1	1	100	100	57	1	1	1

*The release location resides within the receptor boundaries.

Table 12-3 Summary of the maximum residence time of floating oil exposure for each individual grid cell within each individual receptor. Results are based on a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March) Maximum residence time of floating oil exposure (days)			Winter (April to October) Maximum residence time of floating oil exposure (days)		
		Low	Moderate	High	Low	Moderate	High
AMP	Boags	< 1	-	-	< 1	-	-
BIA	Black-browed Albatross - Foraging*	1	1	< 1	1	1	< 1
	Bullers Albatross - Foraging*	1	1	< 1	1	1	< 1
	Campbell Albatross - Foraging*	1	1	< 1	1	1	< 1
	Common Diving-petrel - Foraging*	1	1	< 1	1	1	< 1
	Indian Yellow-nosed Albatross - Foraging*	1	1	< 1	1	1	< 1
	Pygmy Blue Whale - Distribution*	1	1	< 1	1	1	< 1
	Pygmy Blue Whale - Foraging*	1	1	< 1	1	1	< 1
	Pygmy Blue Whale - Known Foraging Area	-	-	-	< 1	-	-
	Short-tailed Shearwater - Foraging*	1	1	< 1	1	1	< 1
	Shy Albatross - Foraging*	1	1	< 1	1	1	< 1
	Southern Right Whale - Known Core Range*	1	1	< 1	1	1	< 1
	Wandering Albatross - Foraging*	1	1	< 1	1	1	< 1
	White Shark - Distribution*	1	1	< 1	1	1	< 1
	White-faced Storm-petrel - Foraging*	1	1	< 1	1	1	< 1
IMCRA	Central Bass Strait*	1	1	< 1	1	1	< 1

*The release location resides within the receptor boundaries.

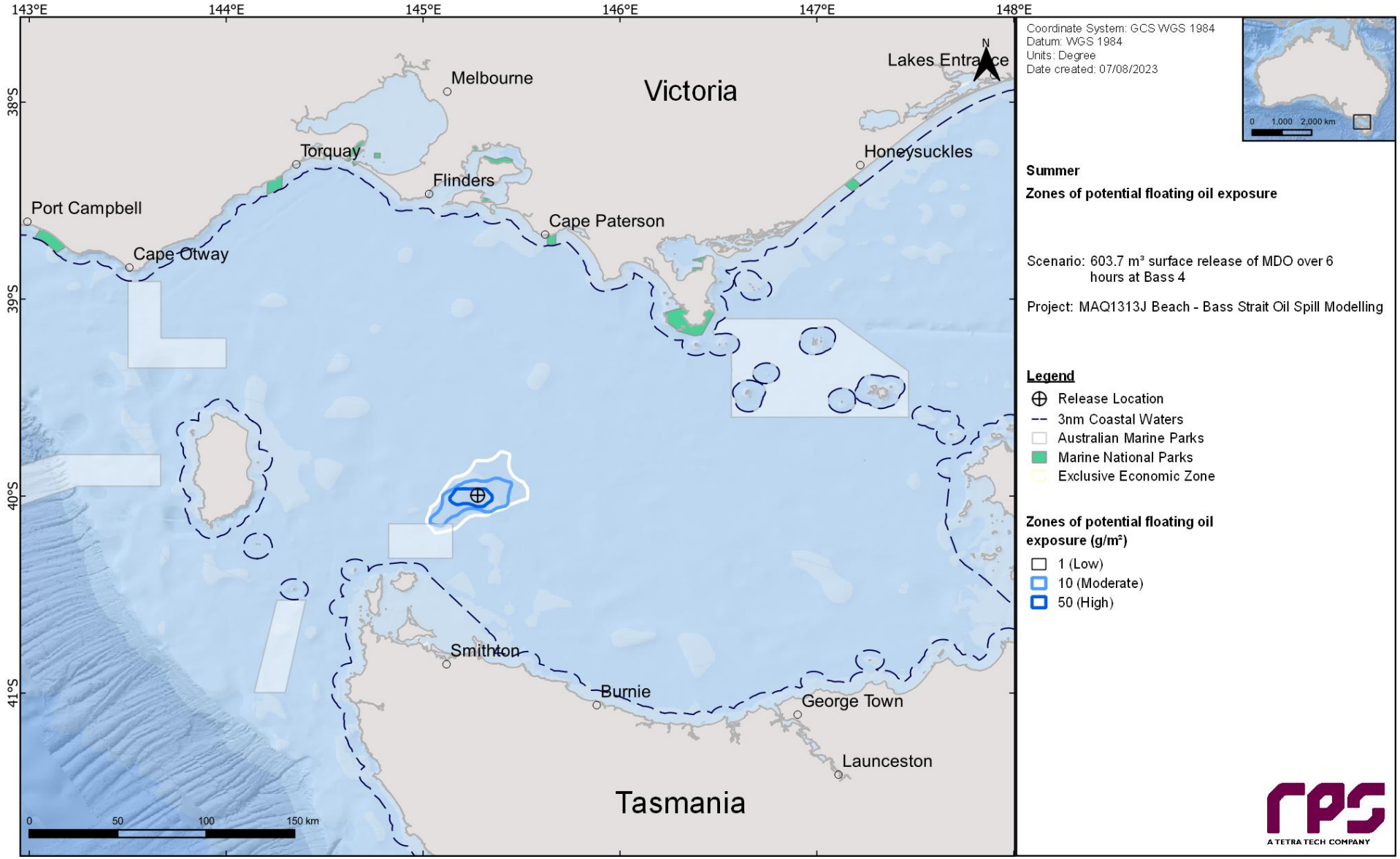

Figure 12-2 Zones of potential floating oil exposure in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations during summer conditions.

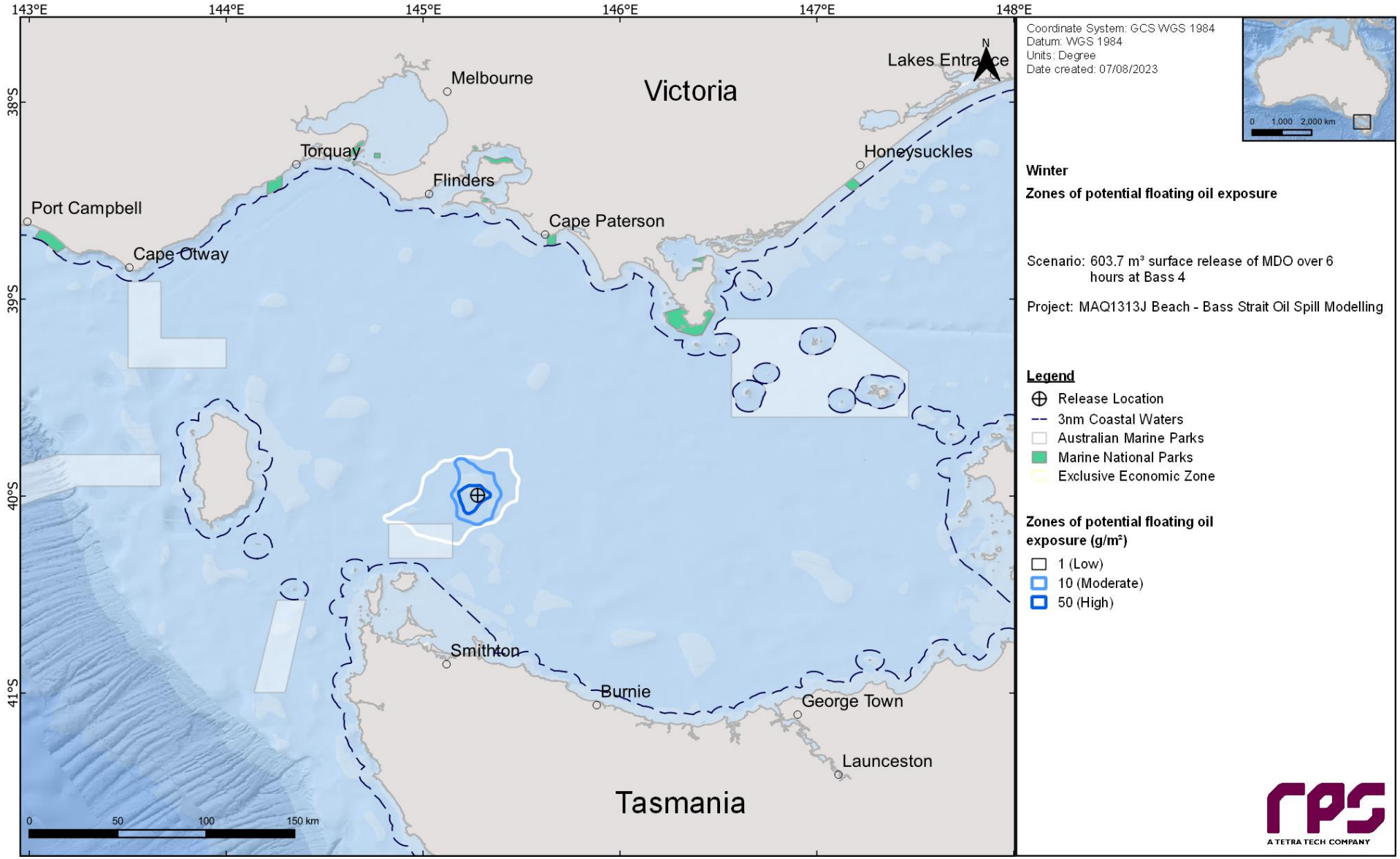

Figure 12-3 Zones of potential floating oil exposure in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations during winter conditions.

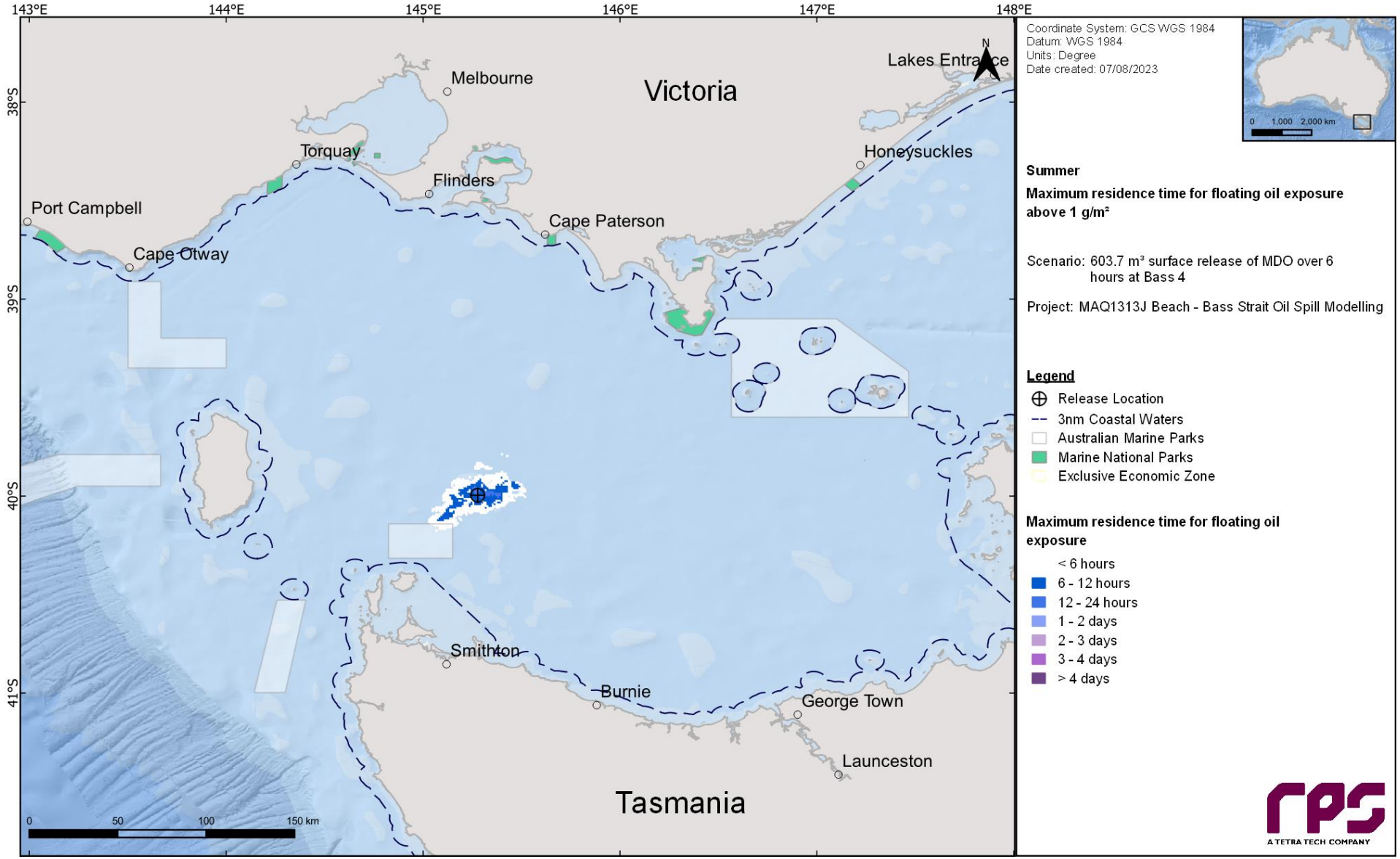

Figure 12-4 Maximum residence time of floating oil exposure above 1 g/m², in the event of 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations during summer conditions.

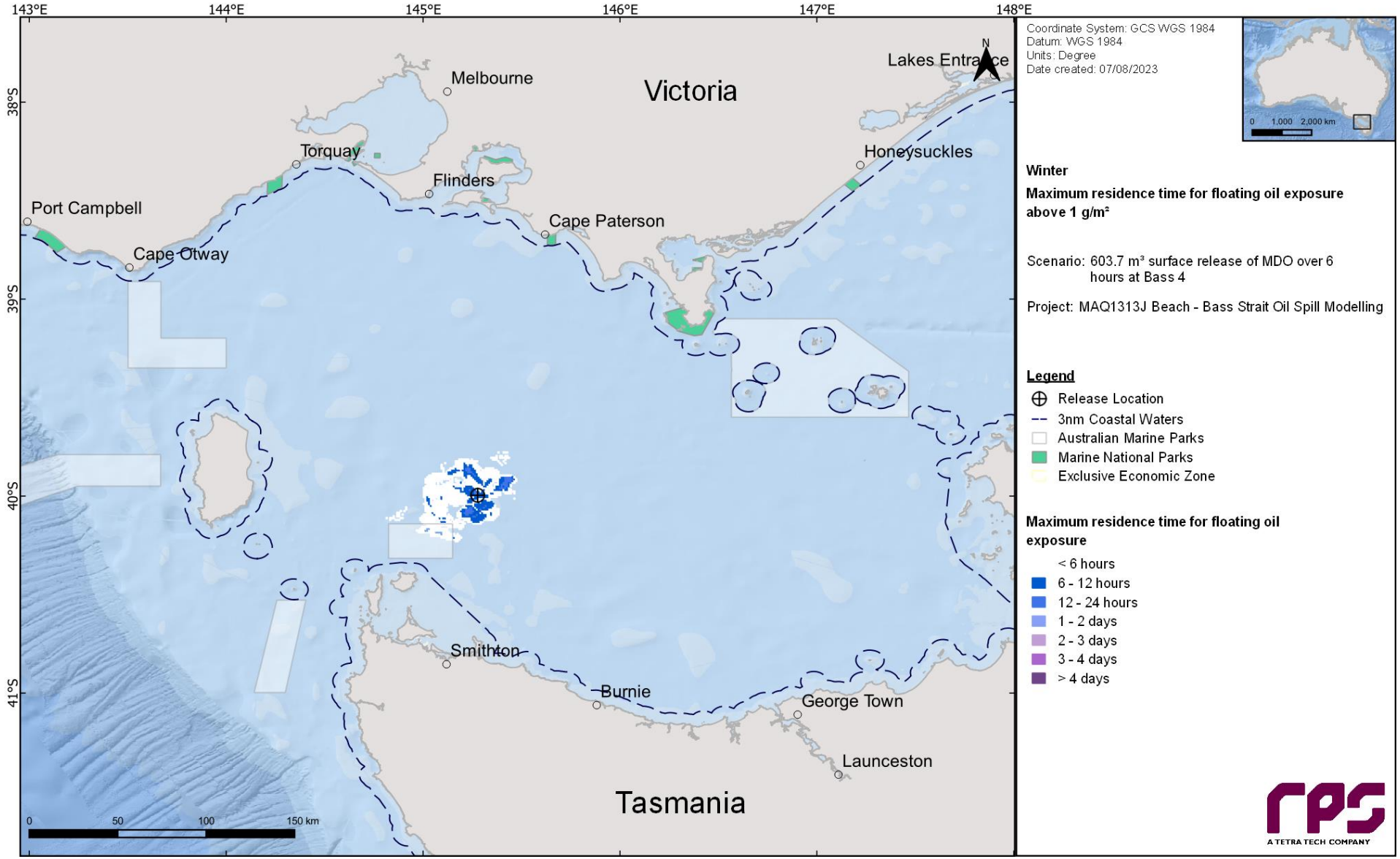

Figure 12-5 Maximum residence time of floating oil exposure above 1 g/m², in the event of 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations during winter conditions.

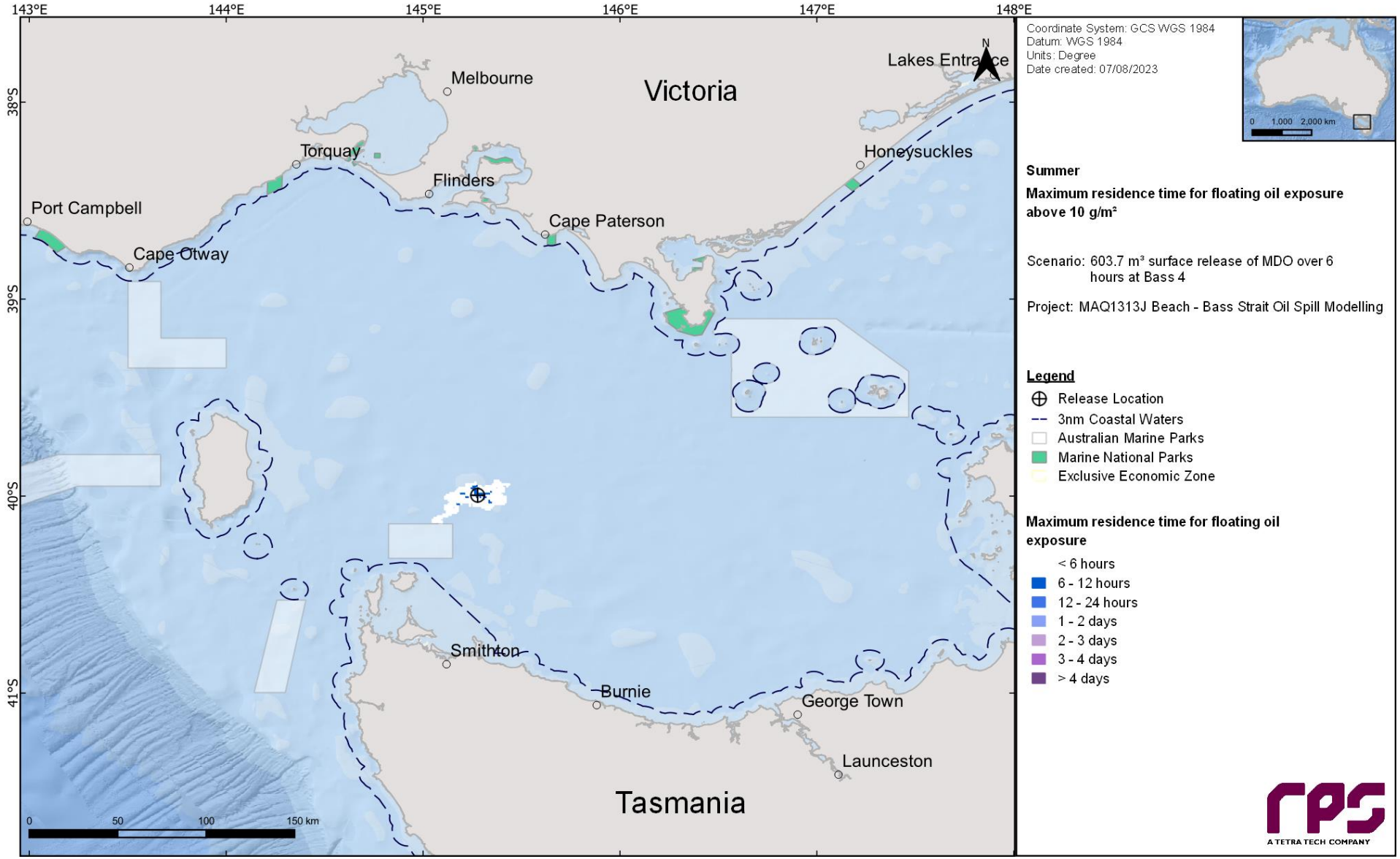

Figure 12-6 Maximum residence time of floating oil exposure above 10 g/m², in the event of 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations during summer conditions.

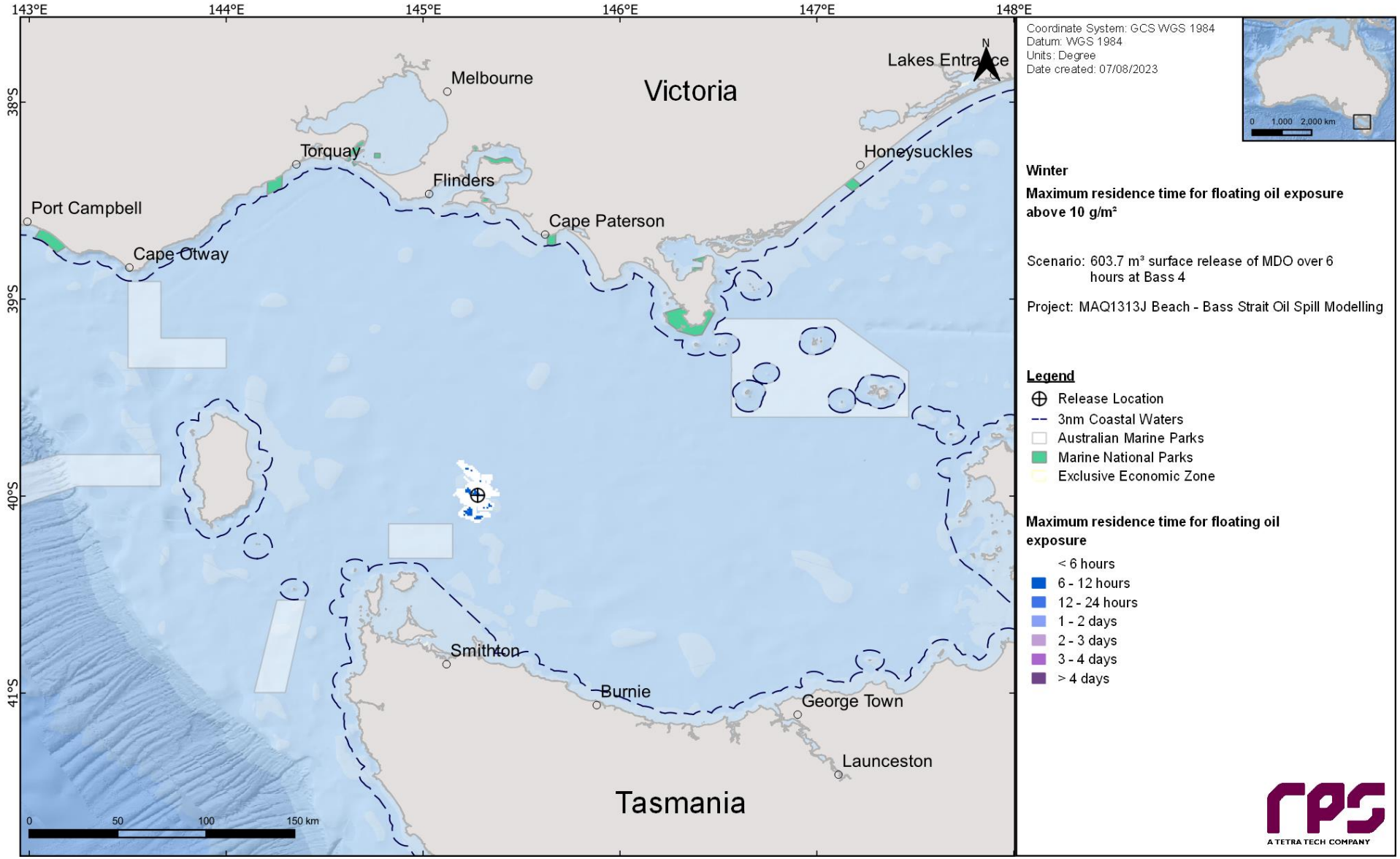

Figure 12-7 Maximum residence time of floating oil exposure above 10 g/m², in the event of 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations during winter conditions.

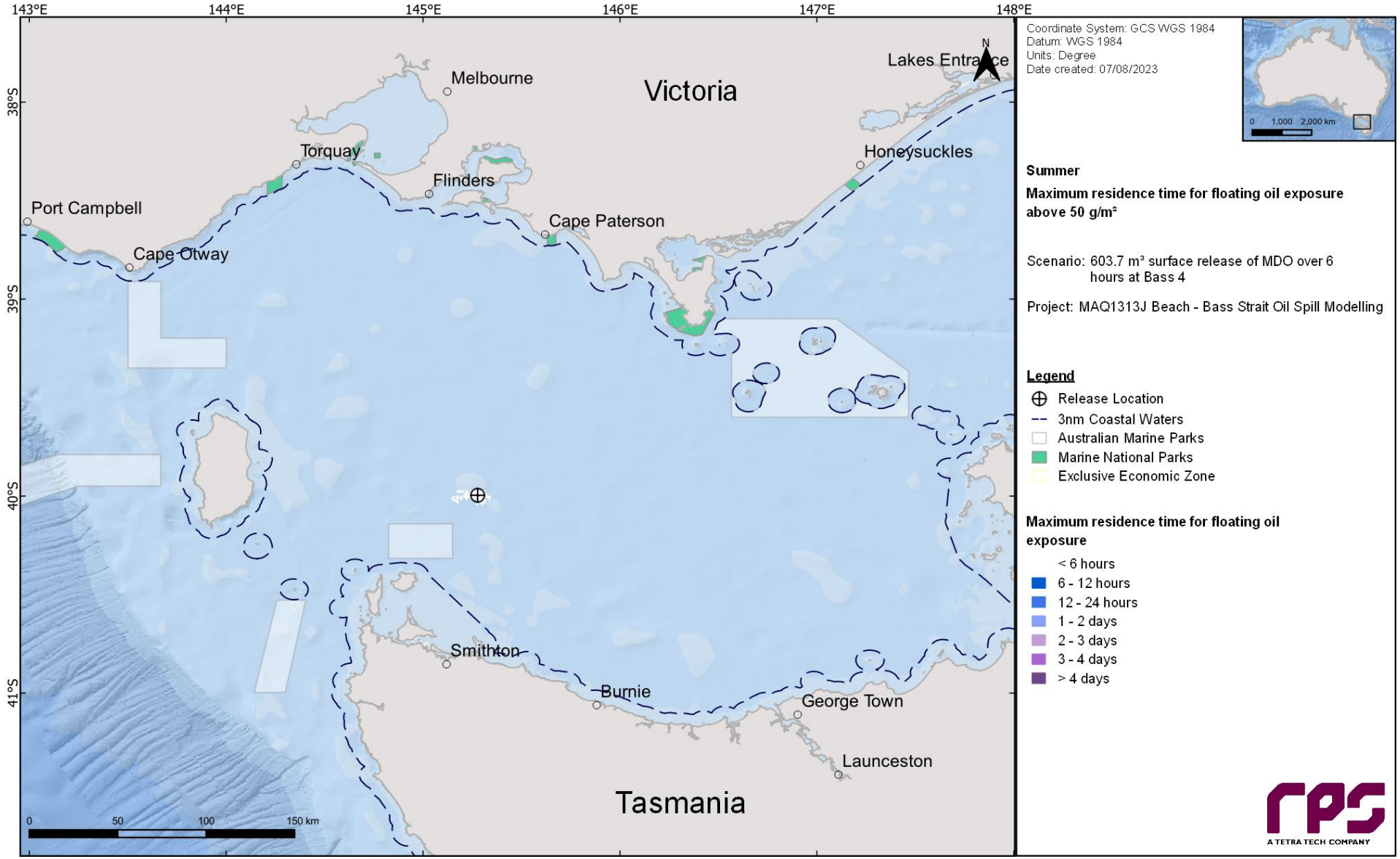

Figure 12-8 Maximum residence time of floating oil exposure above 50 g/m², in the event of 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations during summer conditions.

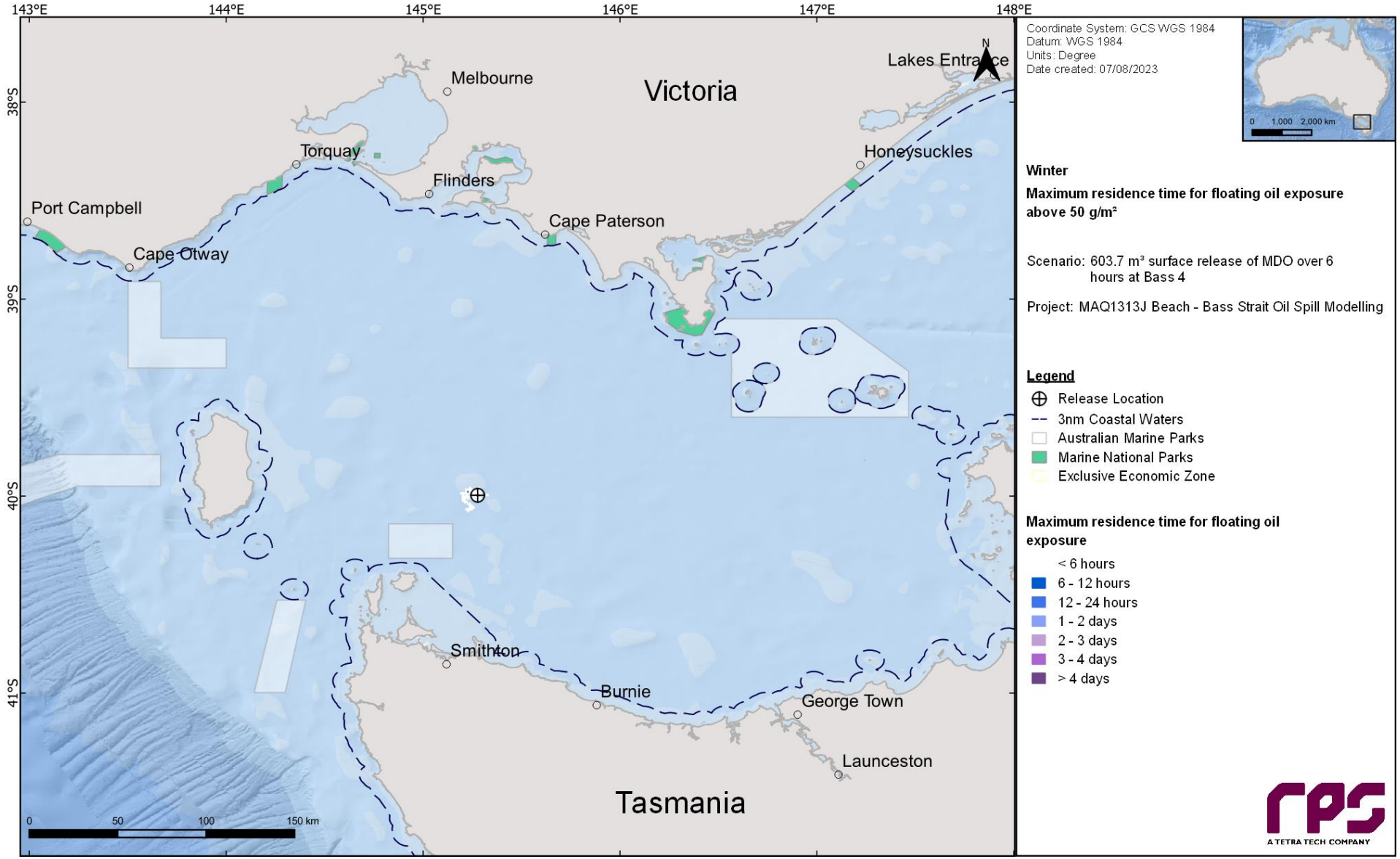

Figure 12-9 Maximum residence time of floating oil exposure above 50 g/m², in the event of 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations during winter conditions.

12.3 Shoreline Accumulation

Table 12-4 presents a summary of the predicted potential shoreline accumulation during the summer and winter conditions. The probability of accumulation to any shoreline at, or above, the low level (10 g/m^2) threshold was 11% during summer conditions and 3% during winter conditions. The minimum time before oil accumulation at, or above, the low threshold was 5 days during summer conditions, and 9 days during winter conditions. The maximum volume ashore for a single spill trajectory during the summer and winter conditions was 3 m^3 and 6 m^3, respectively, whilst the maximum length of shoreline accumulation at the low threshold was 6 km and 10 km, respectively. No shoreline accumulation at the moderate (100 g/m^2) or high threshold (1,000 g/m^2) was predicted.

Table 12-5 summarises the shoreline accumulation on individual receptors during the summer and winter conditions. The highest probability of shoreline accumulation at the low threshold was 11%.

The minimum time before shoreline accumulation above the low threshold was 5 days predicted for during summer conditions and 9 days during winter conditions.

The summer and winter conditions maximum potential shoreline loading above the low, moderate and high shoreline thresholds are presented in Figure 12-10 and Figure 12-11, respectively.

Table 12-4 Summary of oil accumulation across all shorelines. Results are based on a 603.7 m^3 surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations per season.

Shoreline Statistics	Summer	Winter
Probability of accumulation on any shoreline (%)	11	3
Absolute minimum time for visible oil to shore (days)	5	9
Maximum total volume of hydrocarbons ashore (m^3)	3	6
Average volume of hydrocarbons ashore (m^3)	1	0
Maximum length of the shoreline at **10 g/m^2** (km)	6	10
Average shoreline length (km) at **10 g/m^2** (km)	2	5
Maximum length of the shoreline at **100 g/m^2** (km)	-	-
Average shoreline length (km) at **100 g/m^2** (km)	-	-
Maximum length of the shoreline at **1,000 g/m^2** (km)	-	-
Average shoreline length (km) at **1,000 g/m^2** (km)	-	-

Table 12-5 Summary of oil accumulation on individual shoreline receptors. Results are based on a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations per season.

Shoreline Receptor		Summer																			Winter													
		Maximum probability of shoreline loading (%)			Minimum time before shoreline accumulation (days)			Load on shoreline (g/m²)		Volume on shoreline (m³)		Mean length of shoreline accumulation (km)			Maximum length of shoreline accumulation (km)			Maximum probability of shoreline loading (%)			Minimum time before shoreline accumulation (days)			Load on shoreline (g/m²)		Volume on shoreline (m³)		Mean length of shoreline accumulation (km)			Maximum length of shoreline accumulation (km)		
		Low	Mod	High	Low	Mod	High	Mean	Peak	Mean	Peak	Low	Mod	High	Low	Mod	High	Low	Mod	High	Low	Mod	High	Mean	Peak	Mean	Peak	Low	Mod	High	Low	Mod	High
SHORE	Albatross Island	1	-	-	8	-	-	3	12	< 1	< 1	1	-	-	1	-	-	1	-	-	9	-	-	4	12	< 1	< 1	1	-	-	1	-	-
	Circular Head	2	-	-	5	-	-	2	20	< 1	2	3	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hunter Island	10	-	-	5	-	-	2	21	< 1	1	2	-	-	4	-	-	2	-	-	12	-	-	2	39	1	3	5	-	-	6	-	-
	Three Hummock Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	9	-	-	6	48	1	1	3	-	-	3	-	-

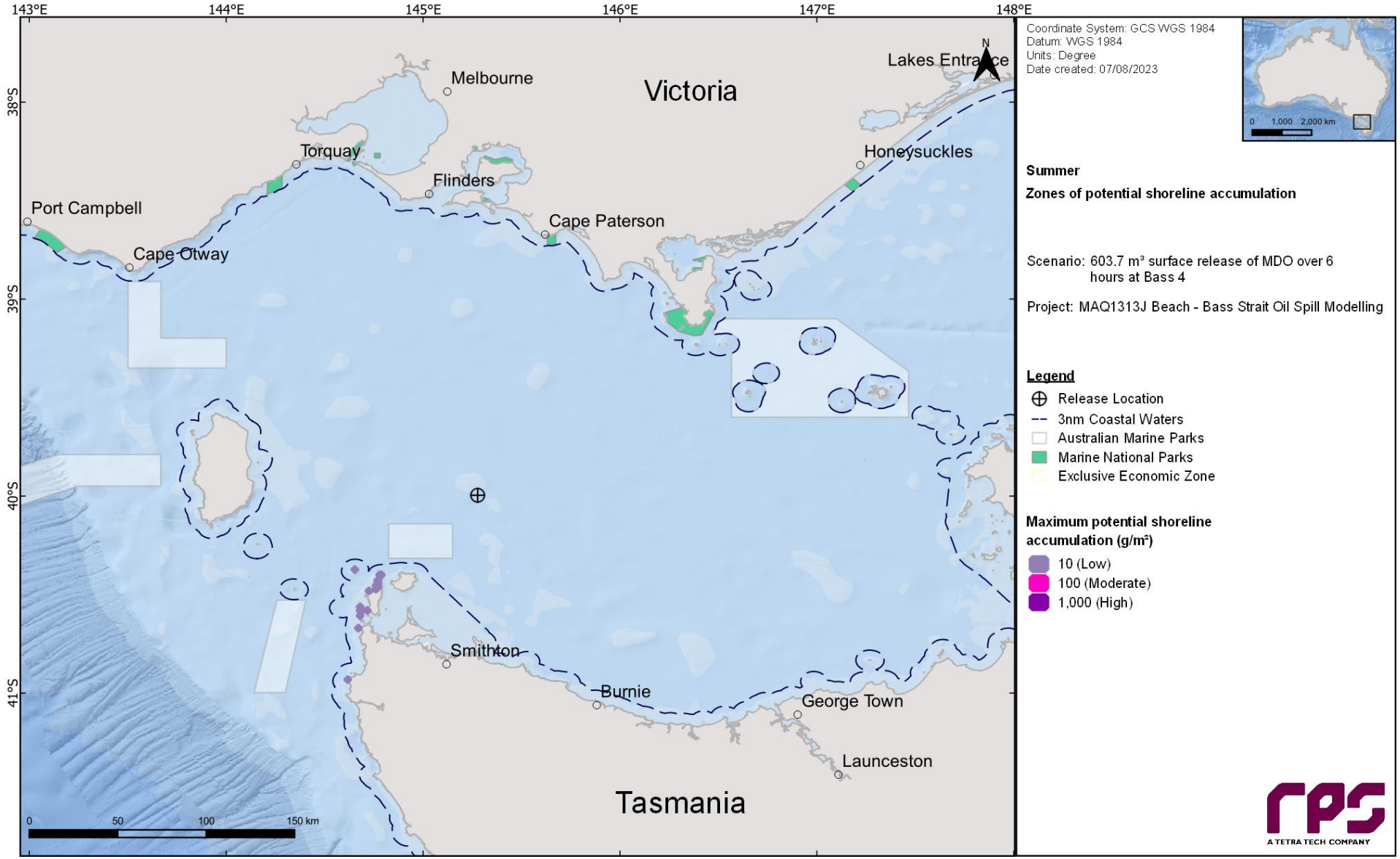

Figure 12-10 Maximum potential shoreline loading in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations during summer conditions.

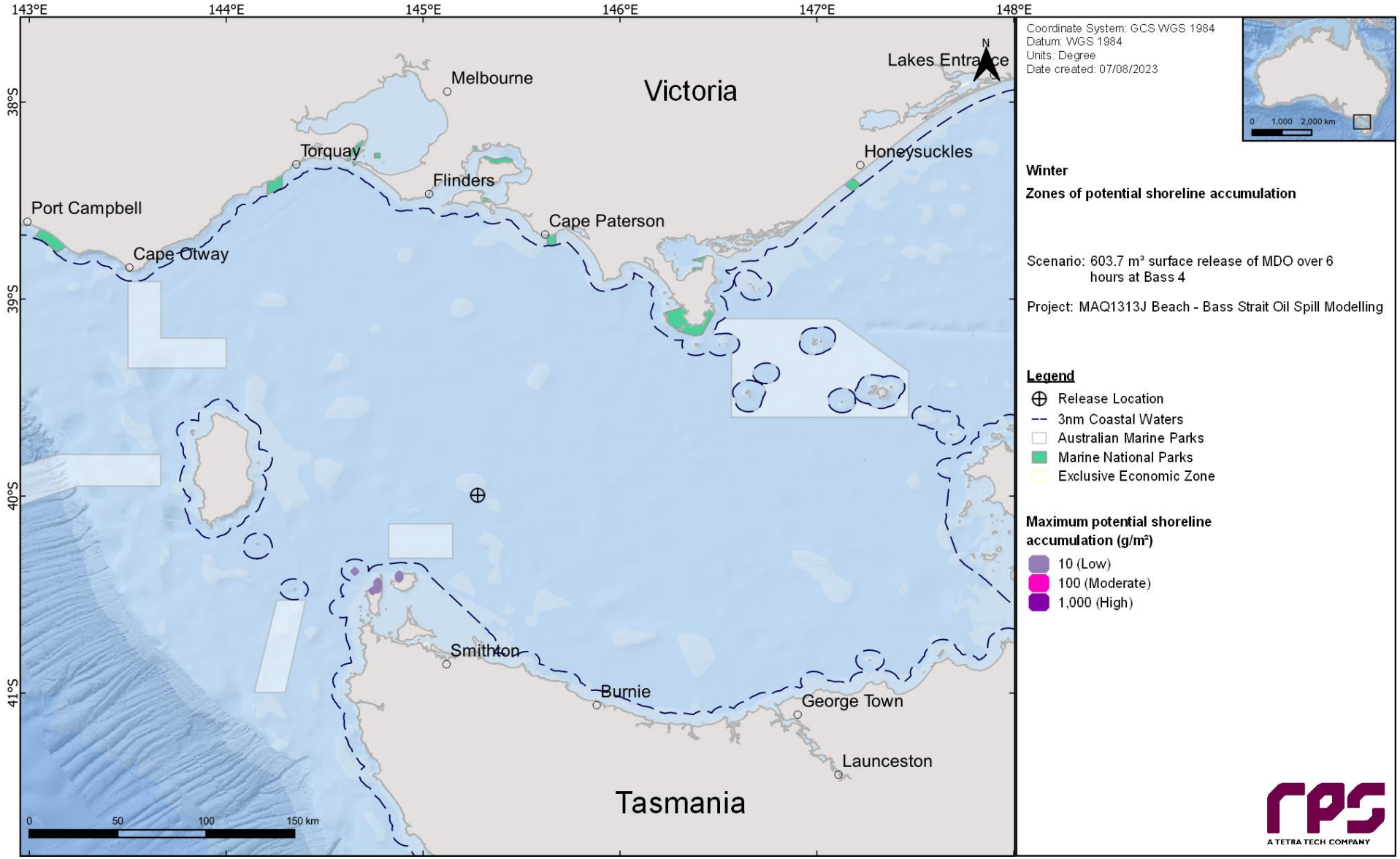

Figure 12-11 Maximum potential shoreline loading in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations during winter conditions.

12.4 In-water exposure

12.4.1 Dissolved Hydrocarbons

Table 12-6 summarises the probability of exposure to individual receptors from dissolved hydrocarbons in the 0-10 m layer during the summer and winter conditions. No dissolved hydrocarbon exposure at the high (400 ppb) threshold was predicted,

Outside of the receptors that the Bellerive release location resides within (refer to Table 10-2), the highest concentration of dissolved hydrocarbon was predicted for the Boags AMP (summer – 53 ppb, winter – 36 ppb), which also revealed the highest probability of low dissolved hydrocarbon exposure (summer – 4%, winter – 3%).

Table 12-7 presents the predicted minimum time to dissolved hydrocarbon exposure and maximum residence time for dissolved hydrocarbon exposure to individual receptors, in the 0-10 m depth layer, for all seasonal conditions and all thresholds assessed. No receptors revealed residence times above 1 days for the low threshold.

Figure 12-12 and Figure 12-13 present the zones of potential dissolved hydrocarbon exposure for the 0-10 m depth layer, for each threshold assessed under summer and winter conditions, respectively.

Figure 12-14 to Figure 12.17 present the maximum residence time of dissolved hydrocarbon exposure for the NOPSEMA thresholds in summer and winter.

Table 12-6 Probability of dissolved hydrocarbons exposure to marine based receptors in the 0–10 m dept. Results are based on a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March)				Winter (April to October)			
		Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure			Maximum dissolved hydrocarbon exposure	Probability of dissolved hydrocarbon exposure		
			Low	Moderate	High		Low	Moderate	High
AMP	Boags	53	4	1	-	36	3	-	-
BIA	Australasian Gannet - Foraging	20	1	-	-	3	-	-	-
	Black-browed Albatross - Foraging*	217	72	26	-	189	69	25	-
	Black-faced Cormorant - Foraging	18	1	-	-	1	-	-	-
	Bullers Albatross - Foraging*	217	72	26	-	189	69	25	-
	Campbell Albatross - Foraging*	217	72	26	-	189	69	25	-
	Common Diving-petrel - Foraging*	217	72	26	-	189	69	25	-
	Indian Yellow-nosed Albatross - Foraging*	217	72	26	-	189	69	25	-
	Little Penguin - Foraging	23	1	-	-	6	-	-	-
	Pygmy Blue Whale - Distribution*	217	72	26	-	189	69	25	-
	Pygmy Blue Whale - Foraging*	217	72	26	-	189	69	25	-
	Pygmy Blue Whale - Known Foraging Area	27	1	-	-	16	1	-	-
	Short-tailed Shearwater - Foraging*	217	72	26	-	189	69	25	-
	Shy Albatross - Breeding	20	1	-	-	1	-	-	-
	Shy Albatross - Foraging*	217	72	26	-	189	69	25	-
	Southern Right Whale - Known Core Range*	217	72	26	-	189	69	25	-
	Wandering Albatross - Foraging*	217	72	26	-	189	69	25	-
	White Shark - Distribution*	217	72	26	-	189	69	25	-
	White-faced Storm-petrel - Foraging*	217	72	26	-	189	69	25	-
IBRA	King Island	20	1	-	-	1	-	-	-
IMCRA	Boags	37	2	-	-	16	1	-	-
	Central Bass Strait*	217	72	26	-	189	69	25	-
	Otway	23	1	-	-	4	-	-	-
SHORE	Albatross Island	20	1	-	-	1	-	-	-
State Waters	Tasmania State Waters	23	1	-	-	3	-	-	-

*The release location resides within the receptor boundaries.

Table 12-7 Predicted minimum time to dissolved hydrocarbon exposure and maximum residence time for dissolved hydrocarbon exposure to individual receptors in the 0-10 m depth layer. Results are based on a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill trajectories per season.

Receptor		Summer (November through to March)						Winter (April to October)					
		Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)			Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
AMP	Boags	1	2	-	< 1	< 1	-	2	-	-	< 1	-	-
BIA	Australasian Gannet - Foraging	2	-	-	< 1	-	-	3	-	-	< 1	-	-
	Black-browed Albatross - Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Black-faced Cormorant - Foraging	3	-	-	< 1	-	-	-	-	-	-	-	-
	Bullers Albatross - Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Campbell Albatross - Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Common Diving-petrel - Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Indian Yellow-nosed Albatross - Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Little Penguin - Foraging	2	-	-	< 1	-	-	-	-	-	-	-	-
	Pygmy Blue Whale - Distribution*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Pygmy Blue Whale - Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Pygmy Blue Whale - Known Foraging Area	2	-	-	< 1	-	-	1	-	-	< 1	-	-
	Short-tailed Shearwater - Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Shy Albatross - Breeding	3	-	-	< 1	-	-	-	-	-	-	-	-
	Shy Albatross - Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Southern Right Whale - Known Core Range*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Wandering Albatross - Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	White Shark - Distribution*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	White-faced Storm-petrel - Foraging*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
IBRA	King Island	3	-	-	< 1	-	-	-	-	-	-	-	-
IMCRA	Boags	2	-	-	< 1	-	-	3	-	-	< 1	-	-
	Central Bass Strait*	< 1	< 1	-	1	< 1	-	< 1	< 1	-	1	< 1	-
	Otway	2	-	-	< 1	-	-	3	-	-	< 1	-	-
SHORE	Albatross Island	3	-	-	< 1	-	-	-	-	-	-	-	-

Receptor		Summer (November through to March)						Winter (April to October)					
		Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)			Minimum time before dissolved hydrocarbon exposure (days)			Maximum residence time for dissolved hydrocarbon exposure (days)		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
State Waters	Tasmania State Waters	2	-	-	< 1	-	-	-	-	-	-	-	-

*The release location resides within the receptor boundaries.

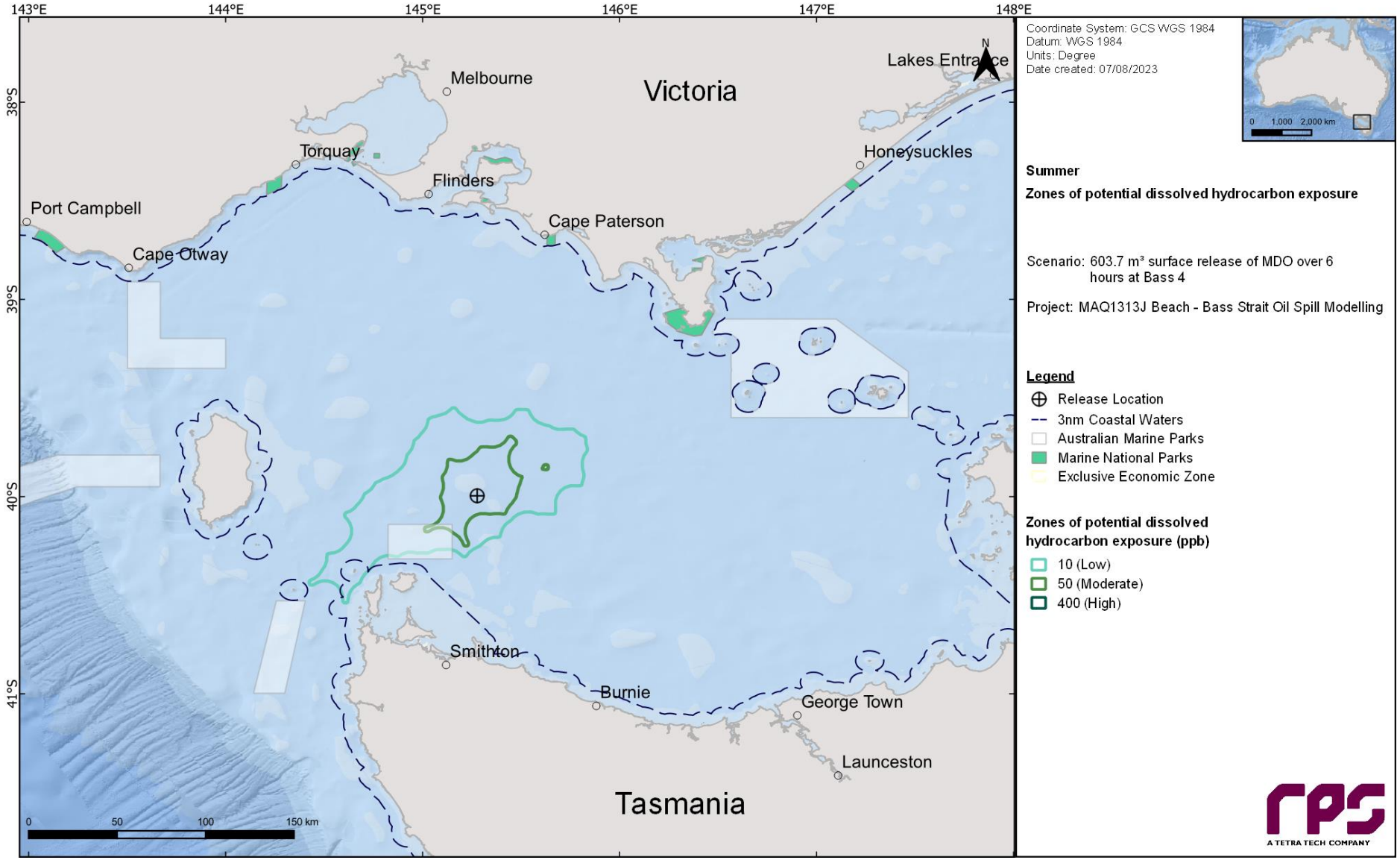

Figure 12-12 Zones of potential dissolved hydrocarbon exposure at 0-10 m below the sea in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations during summer conditions.

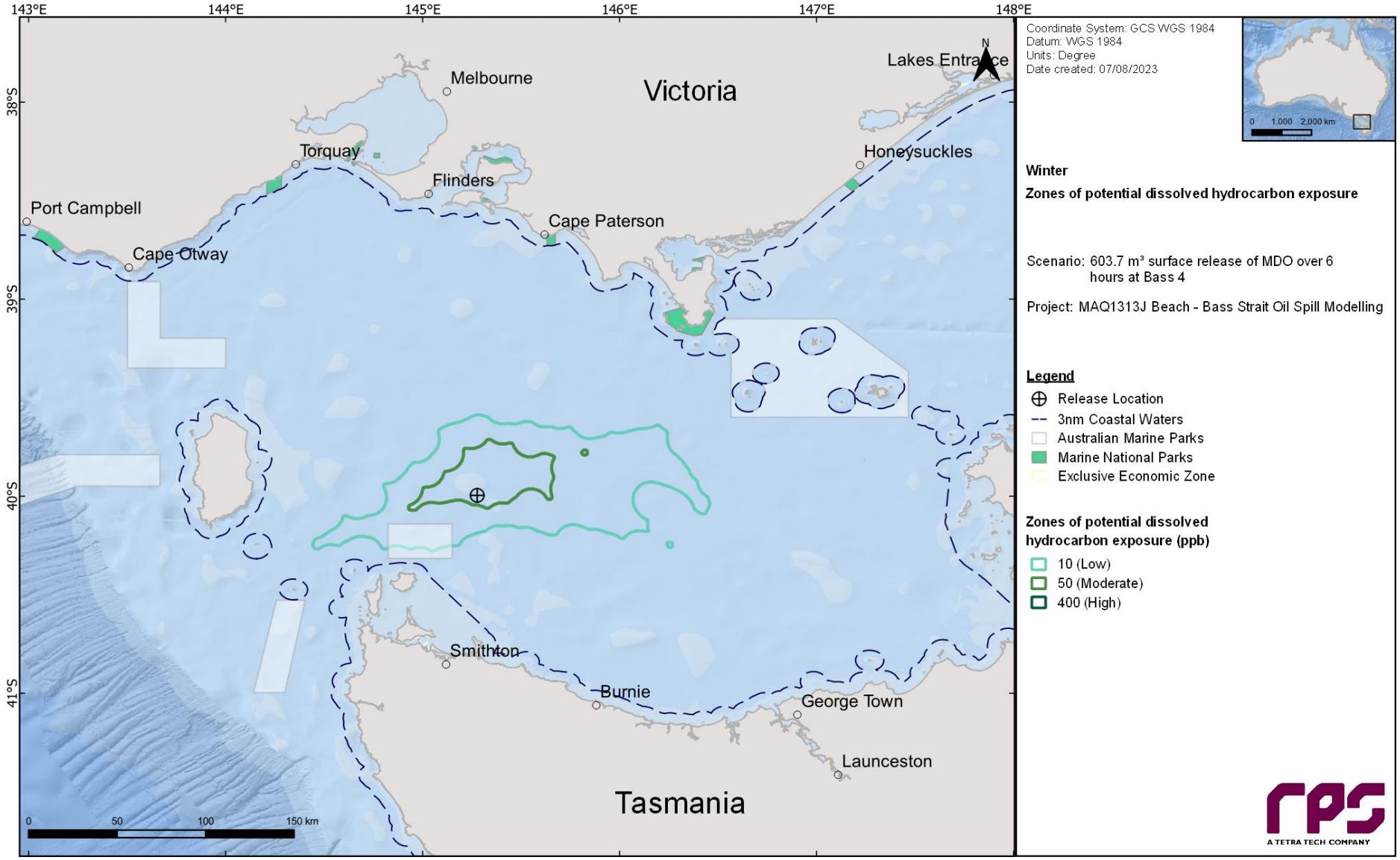

Figure 12-13 Zones of potential dissolved hydrocarbon exposure at 0-10 m below the sea in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations during winter conditions.

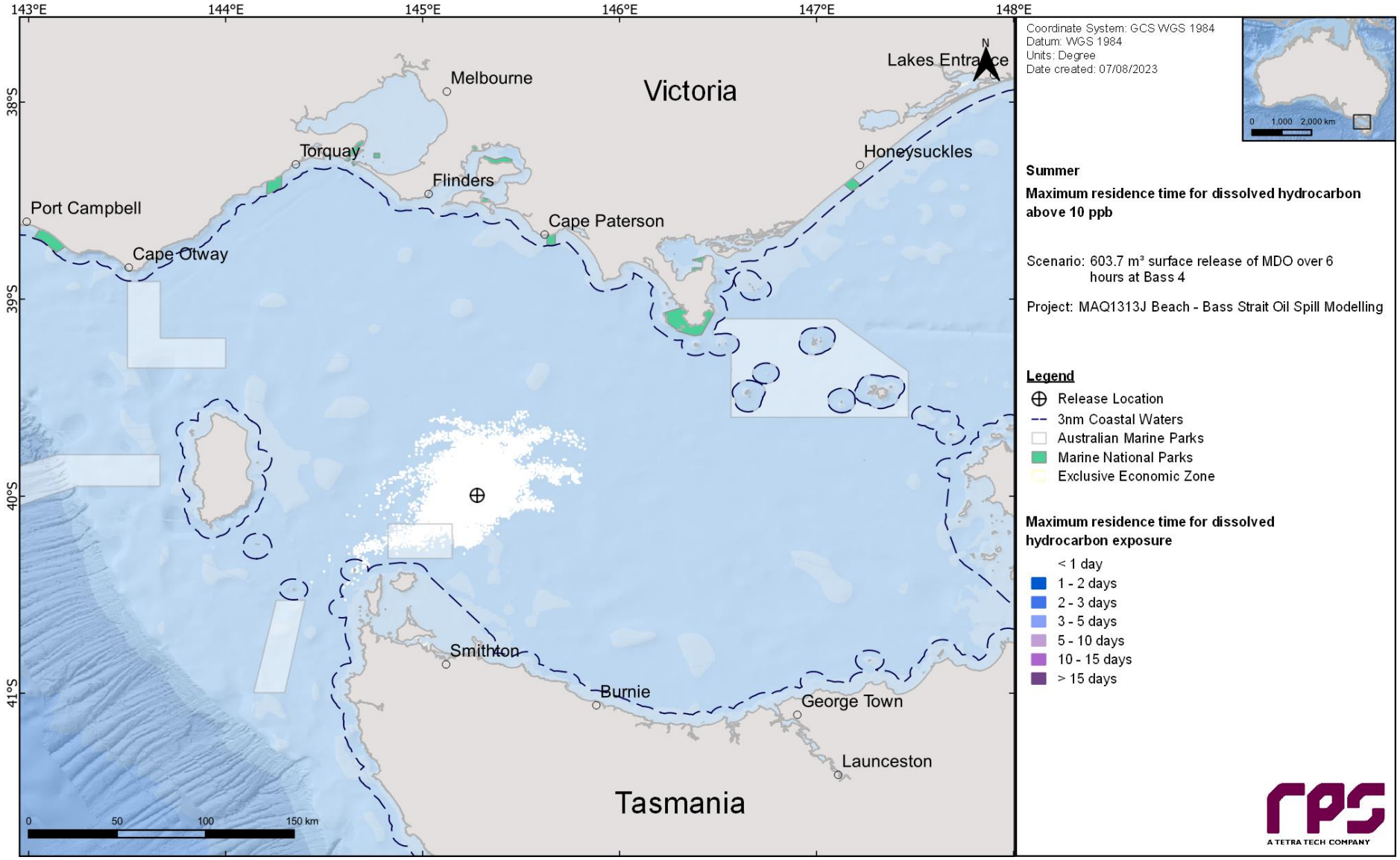

Figure 12-14 Maximum residence time for dissolved hydrocarbon exposure above 10 ppb, at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations during summer conditions.

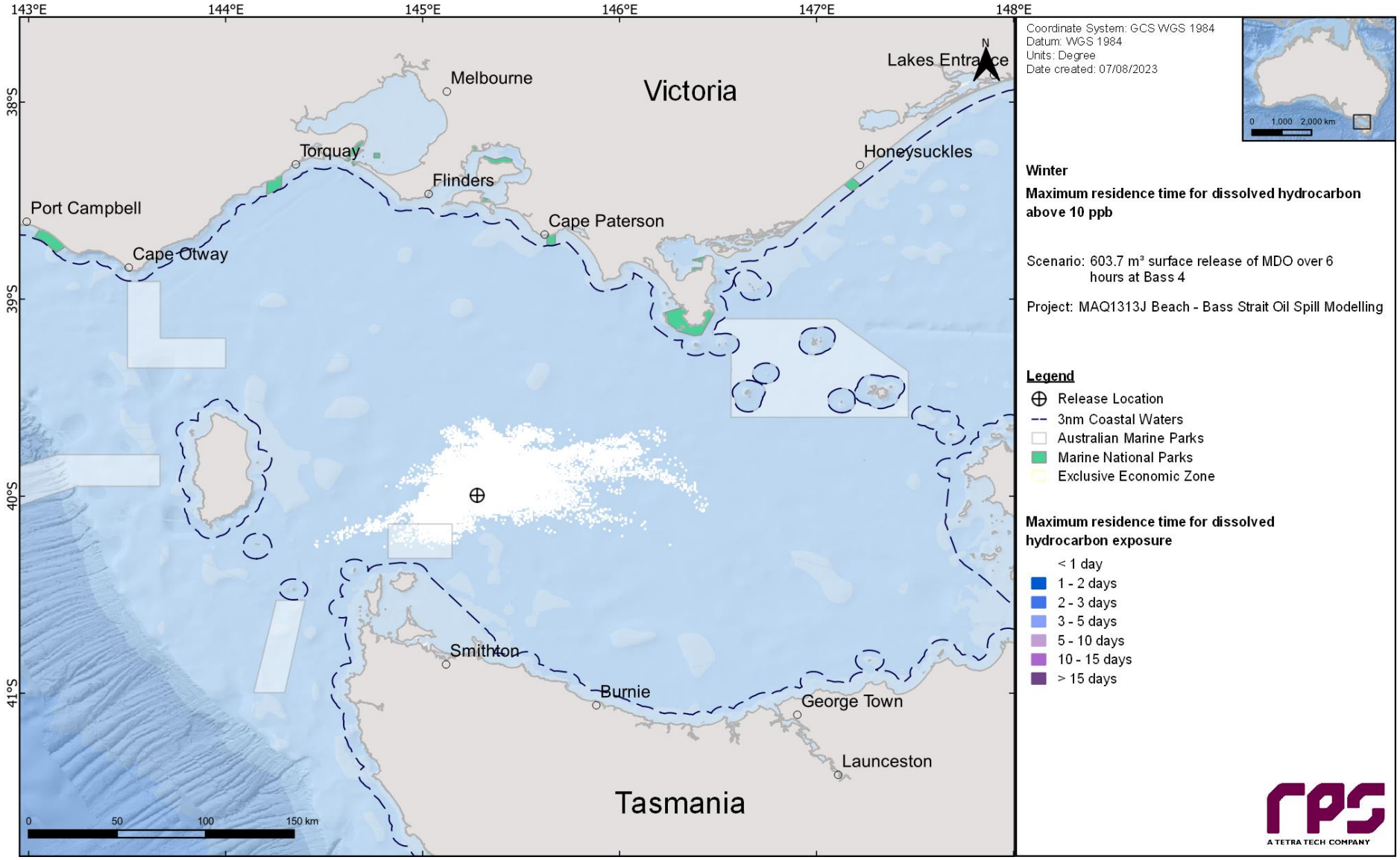

Figure 12.15 Maximum residence time for dissolved hydrocarbon exposure above 10 ppb, at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations during winter conditions.

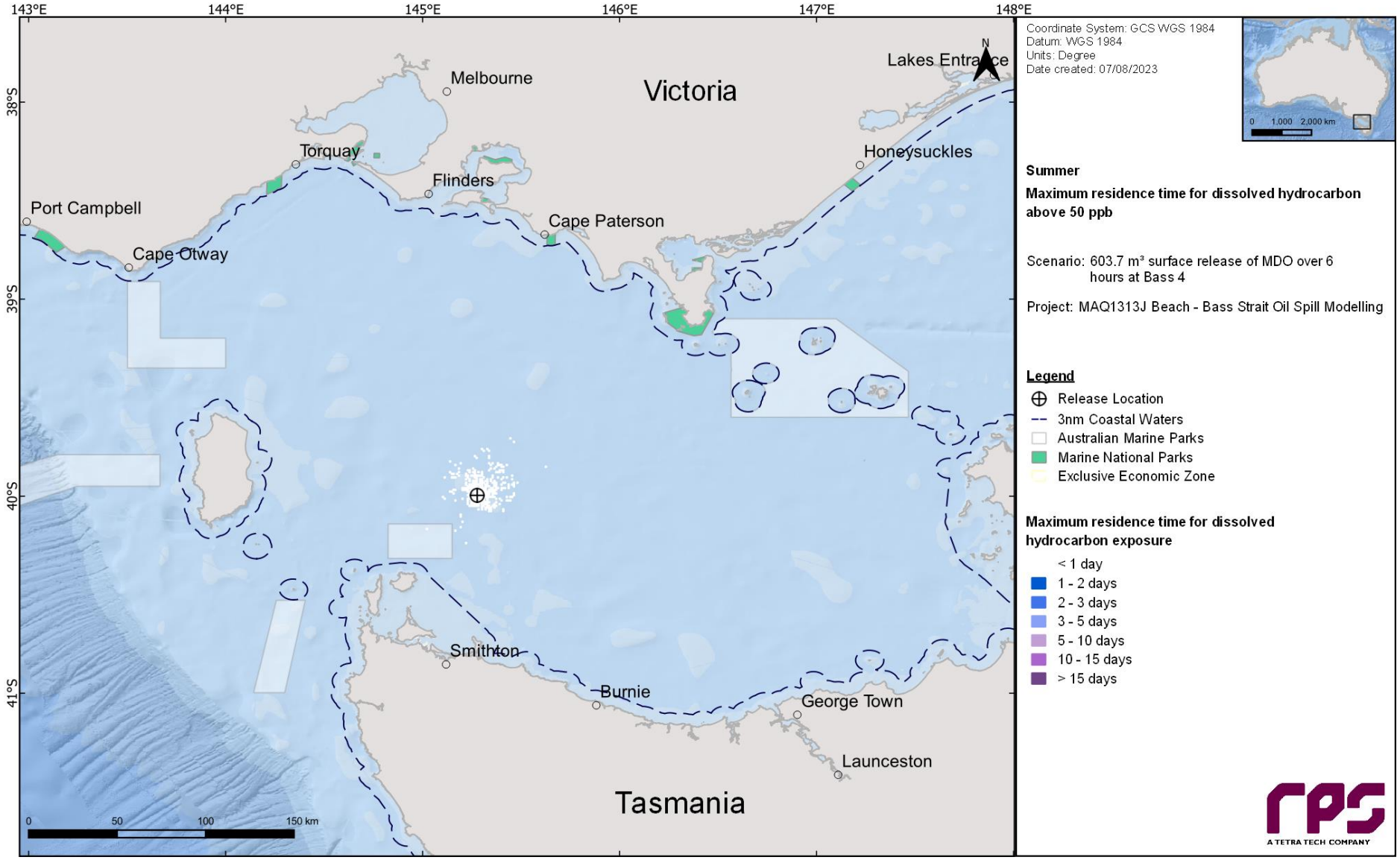

Figure 12.16 Maximum residence time for dissolved hydrocarbon exposure above 50 ppb, at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations during summer conditions.

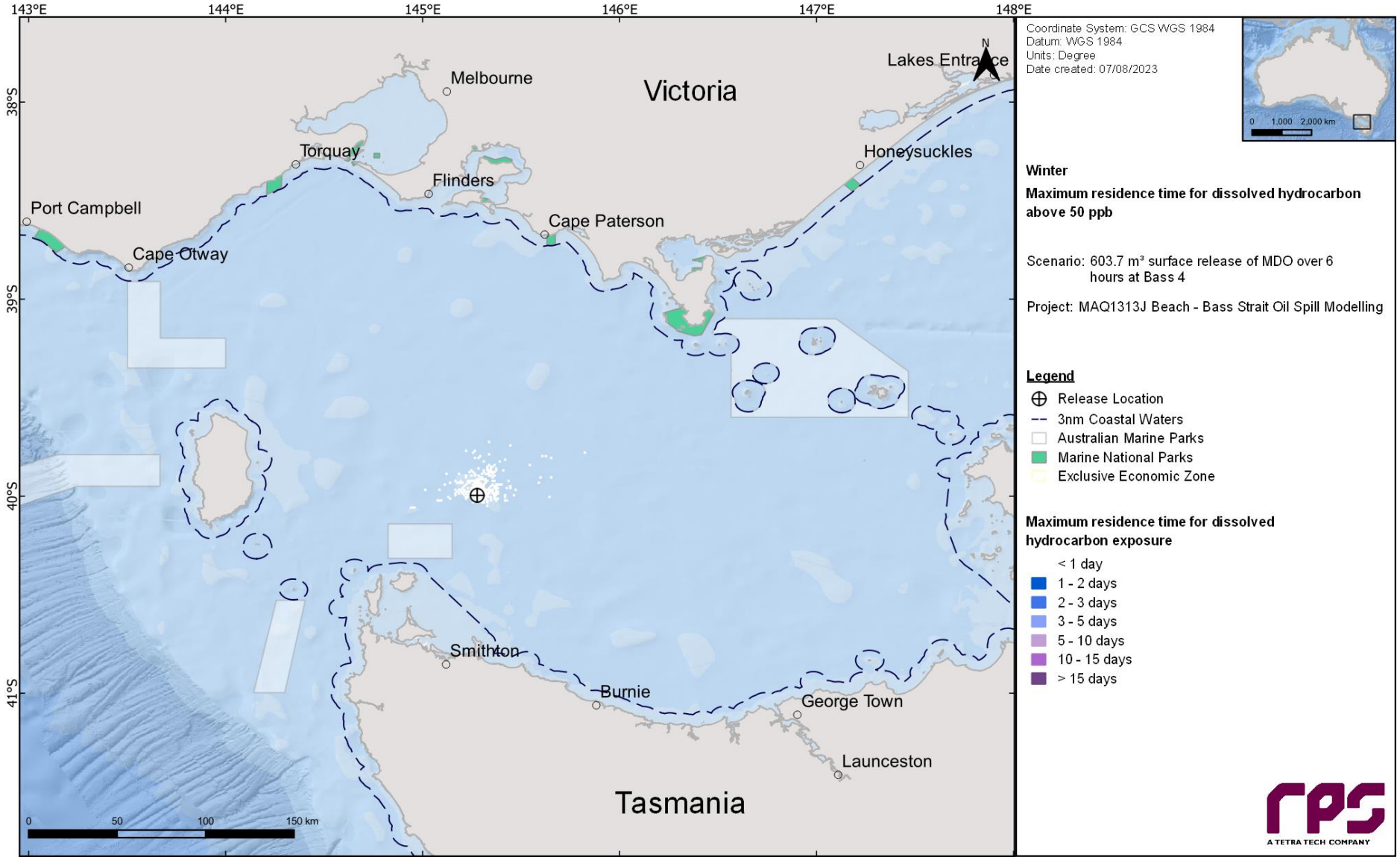

Figure 12.17 Maximum residence time for dissolved hydrocarbon exposure above 50 ppb, at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations during winter conditions.

12.4.2 Entrained Hydrocarbons

Table 12-8 presents the probability of exposure to individual receptors from entrained hydrocarbons in the 0-10 m depth layer for the summer and winter conditions.

Outside of the receptors that the Bass 4 release location resides within (refer to Table 10-2), the highest concentration of entrained hydrocarbon was predicted for Boags AMP (summer – 695 ppb, winter – 623 ppb). The same receptor recorded the highest probability of low entrained hydrocarbon exposure (47% summer and 28% winter).

Table 12-9 presents the predicted minimum time to entrained hydrocarbon exposure and maximum residence time for entrained hydrocarbon exposure to individual receptors in the 0-10 m depth layer, for all seasonal conditions and all thresholds assessed.

Figure 12-18 and Figure 12-19 present the zones of potential entrained hydrocarbon exposure for the 0-10 m depth layer, for each threshold assessed under summer and winter conditions, respectively.

Figure 12-20 to Figure 12-23 present the maximum residence time of entrained hydrocarbon exposure for the NOPSEMA thresholds in summer and winter.

Table 12-8 Probability of entrained hydrocarbons exposure to marine based receptors in the 0–10 m depth layer. Results are based on a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations per season.

Receptor		Summer (November through to March)			Winter (April to October)		
		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure	
			Low	High		Low	High
AMP	Boags	695	47	11	623	28	7
	Franklin	19	4	-	5	-	-
BIA	Antipodean Albatross - Foraging	65	8	-	12	2	-
	Australasian Gannet - Foraging	139	17	1	48	5	-
	Black-browed Albatross - Foraging*	15,877	100	94	17,097	98	95
	Black-faced Cormorant - Foraging	91	10	-	13	2	-
	Bullers Albatross - Foraging*	15,877	100	94	17,097	98	95
	Campbell Albatross - Foraging*	15,877	100	94	17,097	98	95
	Common Diving-petrel - Foraging*	15,877	100	94	17,097	98	95
	Indian Yellow-nosed Albatross - Foraging*	15,877	100	94	17,097	98	95
	Little Penguin - Foraging	150	17	1	29	5	-
	Pygmy Blue Whale - Distribution*	15,877	100	94	17,097	98	95
	Pygmy Blue Whale - Foraging*	15,877	100	94	17,097	98	95
	Pygmy Blue Whale - Known Foraging Area	181	26	2	490	9	1
	Short-tailed Shearwater - Foraging*	15,877	100	94	17,097	98	95
	Shy Albatross - Breeding	103	9	1	14	1	-
	Shy Albatross - Foraging*	15,877	100	94	17,097	98	95
	Southern Right Whale - Connecting Habitat	22	2	-	5	-	-
	Southern Right Whale - Known Core Range*	15,877	100	94	17,097	98	95
	Wandering Albatross - Foraging*	15,877	100	94	17,097	98	95
	White Shark - Distribution*	15,877	100	94	17,097	98	95
	White Shark - Foraging	30	10	-	44	3	-
	White-faced Storm-petrel - Foraging*	15,877	100	94	17,097	98	95
IBRA	King Island	115	13	1	18	2	-
IMCRA	Boags	263	33	2	112	16	1

Receptor		Summer (November through to March)			Winter (April to October)		
		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure		Maximum entrained hydrocarbon exposure	Probability of entrained hydrocarbon exposure	
			Low	High		Low	High
	Central Bass Strait*	15,877	100	94	17,097	98	95
	Flinders	3	-	-	17	1	-
	Franklin	28	4	-	7	-	-
	Otway	150	17	1	71	5	-
RSB	Brown Rocks	23	1	-	5	-	-
SHORE	Albatross Island	115	13	1	17	2	-
	Black Pyramid	17	3	-	4	-	-
	Circular Head	28	2	-	6	-	-
	Hunter Island	20	3	-	14	1	-
	Three Hummock Island	11	1	-	18	1	-
State Waters	Tasmania State Waters	130	16	1	23	5	-

*The release location resides within the receptor boundaries.

Table 12-9 Predicted minimum time to entrained hydrocarbon exposure and maximum residence time for entrained hydrocarbon exposure to individual receptors in the 0-10 m depth layer. Results are based on a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill trajectories per season.

Receptor		Summer (November through to March)				Winter (April to October)			
		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)	
		Low	High	Low	High	Low	High	Low	High
AMP	Boags	1	1	8	1	1	1	6	1
	Franklin	6	-	1	-	-	-	-	-
BIA	Antipodean Albatross - Foraging	3	-	3	-	7	-	< 1	-
	Australasian Gannet - Foraging	2	2	3	< 1	2	-	3	-
	Black-browed Albatross - Foraging*	< 1	< 1	13	3	< 1	< 1	12	3
	Black-faced Cormorant - Foraging	3	-	3	-	7	-	< 1	-
	Bullers Albatross - Foraging*	< 1	< 1	13	3	< 1	< 1	12	3
	Campbell Albatross - Foraging*	< 1	< 1	13	3	< 1	< 1	12	3
	Common Diving-petrel - Foraging*	< 1	< 1	13	3	< 1	< 1	12	3
	Indian Yellow-nosed Albatross - Foraging*	< 1	< 1	13	3	< 1	< 1	12	3
	Little Penguin - Foraging	2	2	3	< 1	3	-	2	-
	Pygmy Blue Whale - Distribution*	< 1	< 1	13	3	< 1	< 1	12	3
	Pygmy Blue Whale - Foraging*	< 1	< 1	13	3	< 1	< 1	12	3
	Pygmy Blue Whale - Known Foraging Area	2	2	6	< 1	1	1	4	1
	Short-tailed Shearwater - Foraging*	< 1	< 1	13	3	< 1	< 1	12	3
	Shy Albatross - Breeding	2	3	2	< 1	8	-	< 1	-
	Shy Albatross - Foraging*	< 1	< 1	13	3	< 1	< 1	12	3
	Southern Right Whale - Connecting Habitat	4	-	2	-	-	-	-	-
	Southern Right Whale - Known Core Range*	< 1	< 1	13	3	< 1	< 1	12	3
	Wandering Albatross - Foraging*	< 1	< 1	13	3	< 1	< 1	12	3
	White Shark - Distribution*	< 1	< 1	13	3	< 1	< 1	12	3
	White Shark - Foraging	6	-	2	-	3	-	1	-
	White-faced Storm-petrel - Foraging*	< 1	< 1	13	3	< 1	< 1	12	3
IBRA	King Island	2	3	2	< 1	7	-	1	-
IMCRA	Boags	1	1	6	1	2	2	3	< 1

Receptor		Summer (November through to March)				Winter (April to October)			
		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)		Minimum time before entrained hydrocarbon exposure (days)		Maximum residence time for entrained hydrocarbon exposure (days)	
		Low	High	Low	High	Low	High	Low	High
	Central Bass Strait*	< 1	< 1	13	3	< 1	< 1	12	3
	Flinders	-	-	-	-	9	-	1	-
	Franklin	4	-	3	-	-	-	-	-
	Otway	2	2	3	< 1	2	-	3	-
RSB	Brown Rocks	4	-	1	-	-	-	-	-
SHORE	Albatross Island	2	3	2	< 1	8	-	1	-
	Black Pyramid	7	-	1	-	-	-	-	-
	Circular Head	4	-	2	-	-	-	-	-
	Hunter Island	3	-	1	-	7	-	< 1	-
	Three Hummock Island	8	-	< 1	-	8	-	1	-
State Waters	Tasmania State Waters	2	2	3	< 1	3	-	1	-

*The release location resides within the receptor boundaries.

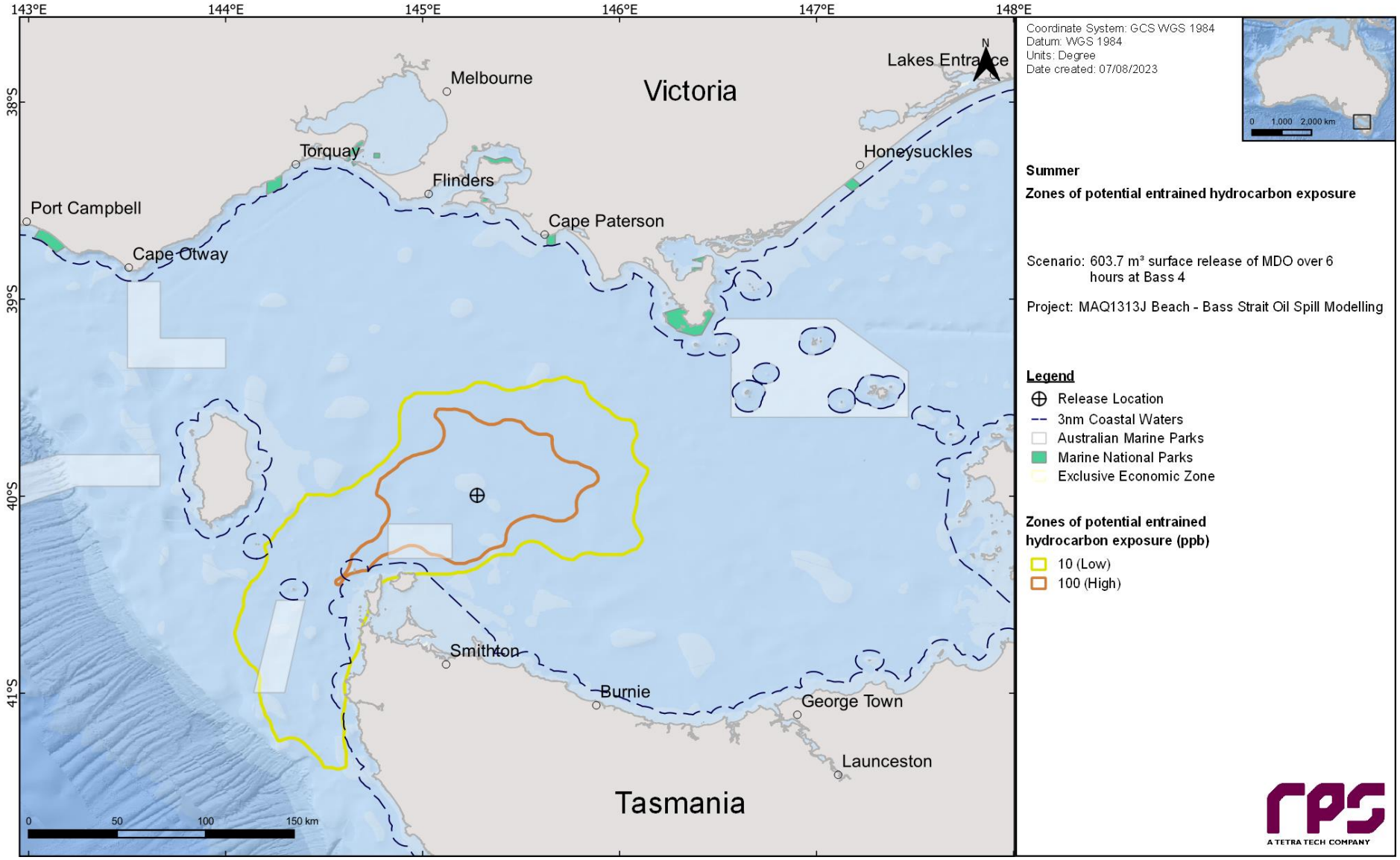

Figure 12-18 Zones of potential entrained hydrocarbon exposure at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations during summer conditions.

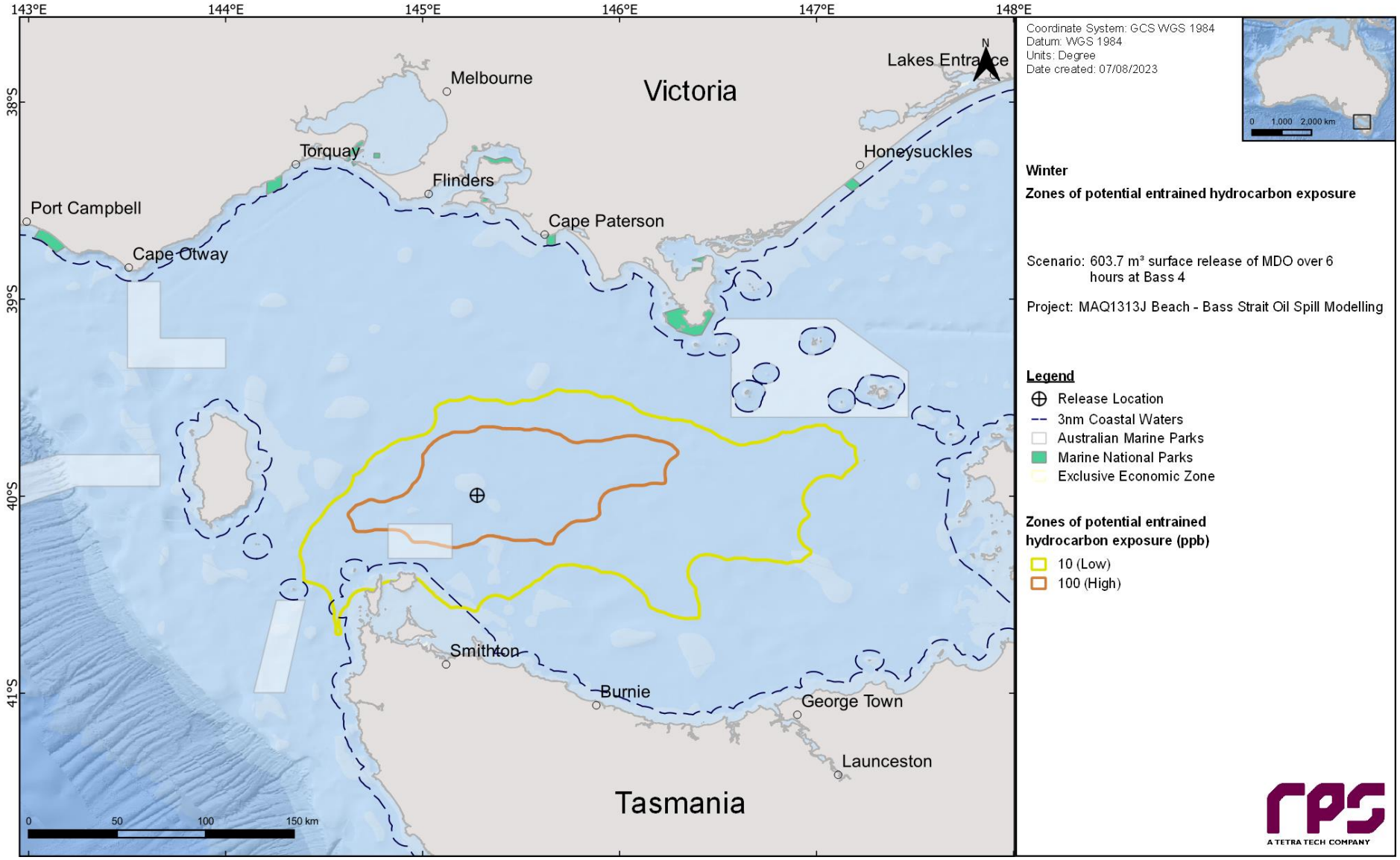

Figure 12-19 Zones of potential entrained hydrocarbon exposure at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations during winter conditions.

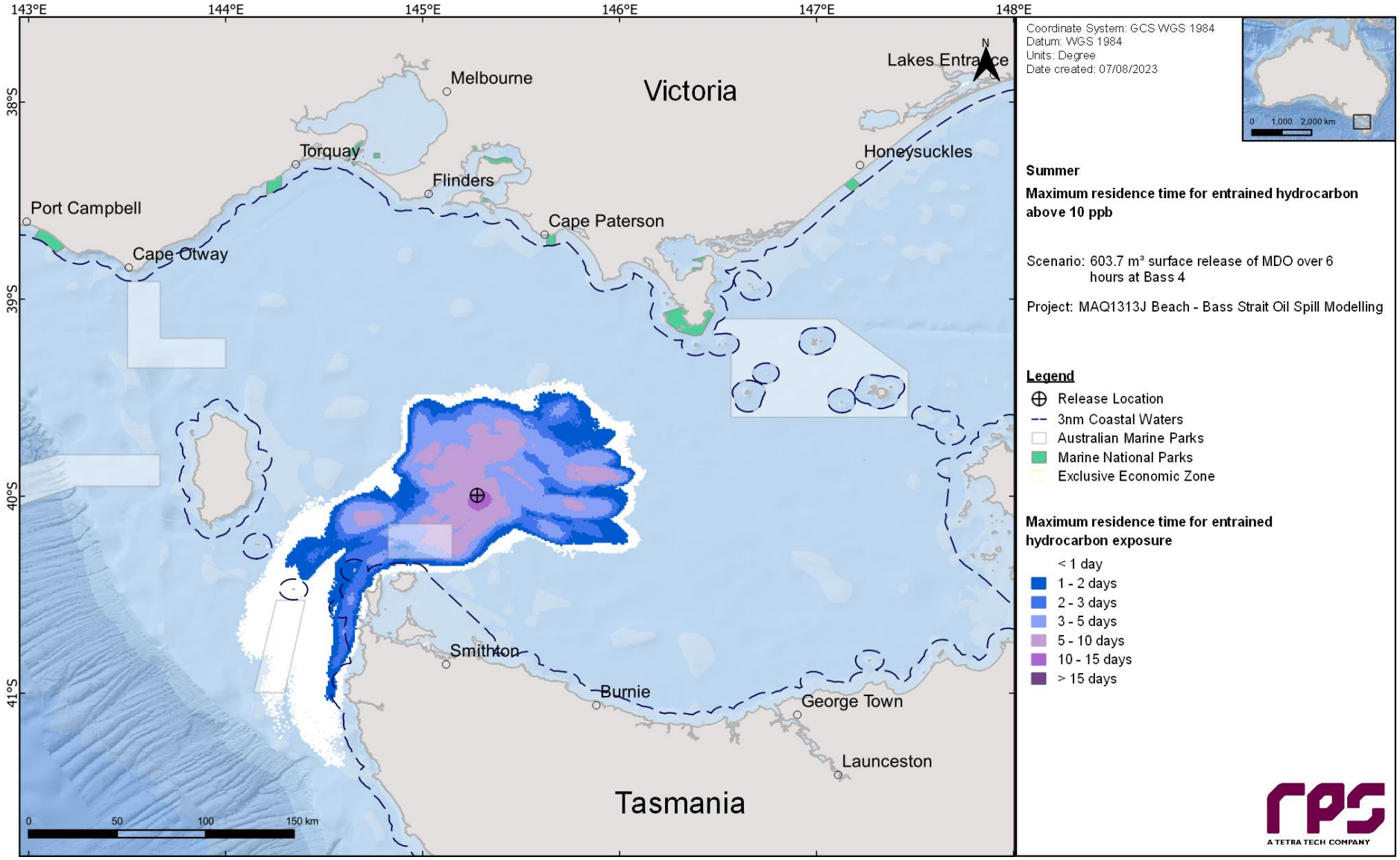

Figure 12-20 Maximum residence time for entrained hydrocarbon exposure above 10 ppb, at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations during summer conditions.

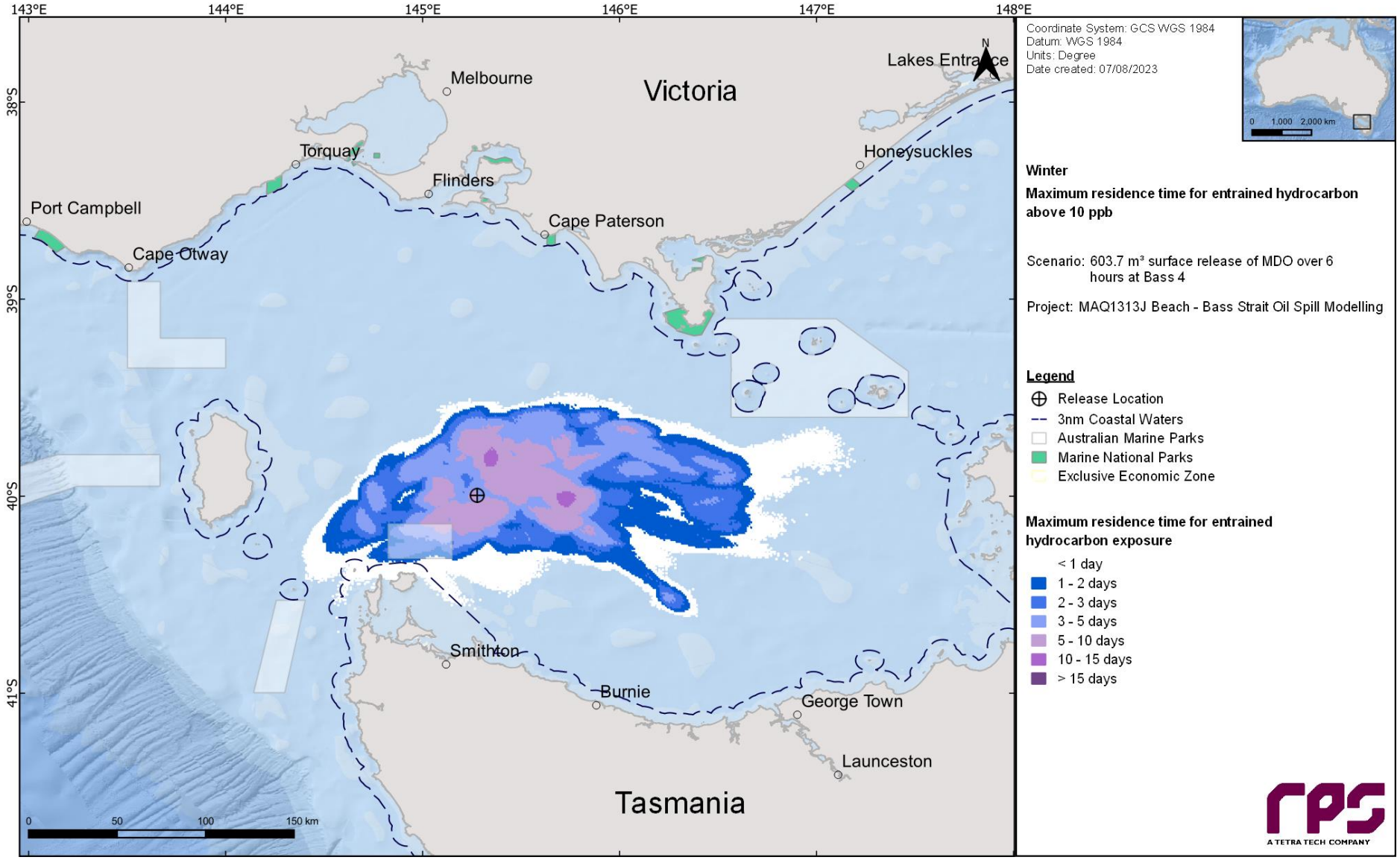

Figure 12-21 Maximum residence time for entrained hydrocarbon exposure above 10 ppb, at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations during winter conditions.

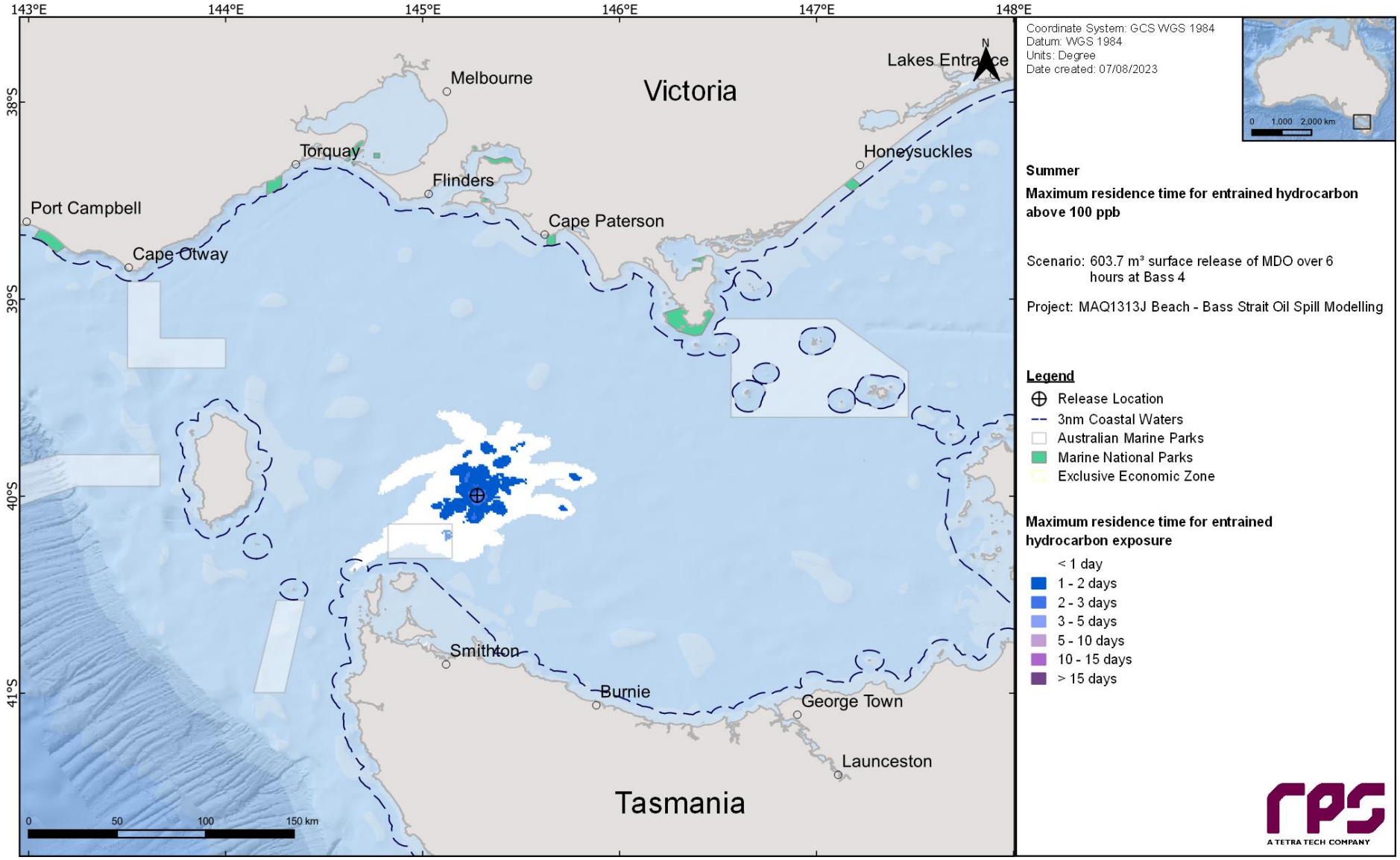

Figure 12-22 Maximum residence time for entrained hydrocarbon exposure above 100 ppb, at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations during summer conditions.

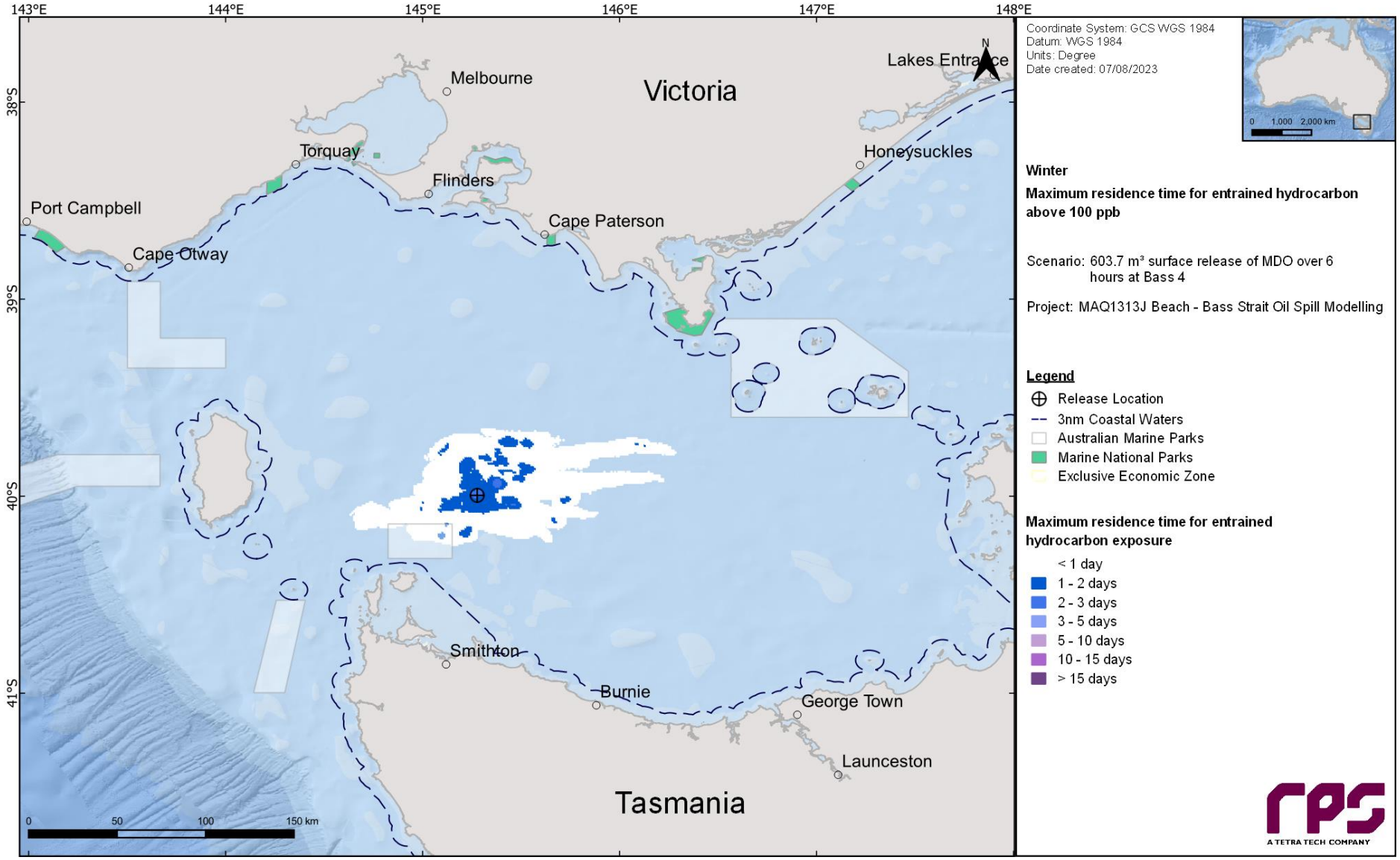

Figure 12-23 Maximum residence time for entrained hydrocarbon exposure above 100 ppb, at 0-10 m below the sea surface in the event of a 603.7 m³ surface release of marine diesel from a loss of containment from vessel collision at the Bass 4 location. The results were calculated from 100 spill simulations during winter conditions.

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